

Workplace bullying and mental health conditions

Disentangling concurrent, prospective, and reverse associations in the Swedish and Danish workforce

Rebecka Holmgren



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Academic dissertation for the Degree of Doctor of Philosophy in Public Health Sciences at Stockholm University to be publicly defended on Thursday 21 May 2026 at 10.00 in Auditorium 6, Albano House 4, Albanovägen 12.

Abstract

Mental health conditions, including both mental disorders and mental distress, are common among adults, including among the working population. Although work generally promotes health, previous research indicates that several factors in the work environment may contribute to poor mental health. This thesis aims to examine whether workplace bullying, defined as repeated exposure to negative acts at work over a prolonged period, contributes to the occurrence of depression and anxiety among individuals of working age. To address this aim, longitudinal survey and register data from Sweden and Denmark are used.

The first paper of the thesis, Paper I, aimed to assess the theoretical and psychometric properties of a measure of workplace bullying used in Papers II-IV. The results showed that the measure captured theoretically grounded experiences of workplace bullying and that it overlapped satisfactorily with established measures of workplace bullying, thereby supporting its validity and justifying its use in the subsequent papers of the thesis.

Paper II examined the association between workplace bullying and anxiety symptoms, as well as whether good leadership quality could mitigate anxiety following exposure to bullying. When exposed individuals were compared with non-exposed individuals, the results indicated a bidirectional association. Exposure to workplace bullying was prospectively associated with an increased risk of higher anxiety, while higher initial anxiety increased the risk of subsequent exposure to workplace bullying. However, in analyses accounting for within-individual changes in bullying status, only immediate, but not long-term, changes in anxiety were observed, and no reverse association was found. Furthermore, no evidence was found of leadership quality moderating these associations.

Paper III examined the association between workplace bullying and sickness absence due to depressive and anxiety disorders, also considering bidirectional associations. The results indicated that individuals exposed to workplace bullying had an increased risk of sickness absence during the subsequent two years compared with non-exposed individuals. However, no clear evidence was found that such sickness absence increased the risk of later exposure to workplace bullying.

The fourth paper of the thesis, Paper IV, examined whether workplace bullying was associated with an increased risk of treatment with psychotropic medication. The analysis was restricted to individuals without prior exposure to workplace bullying and without a recent history of psychotropic medication use. The results suggested an increased risk of initiating psychotropic treatment during the subsequent two years among exposed individuals, with the risk of initiating treatment with antidepressants being particularly pronounced.

In conclusion, the findings of the studies included in this thesis indicate that workplace bullying constitutes a risk factor for depression and anxiety. The consistency of the observed associations, even after adjustment for sociodemographic factors, prior mental health conditions, and other work environment factors, strengthens the credibility of the results. These findings underscore the importance of preventive efforts against workplace bullying and of ensuring that exposed individuals receive adequate and timely support to reduce the risk of subsequent mental health conditions.

Keywords: *workplace bullying, psychosocial work environment, mental health, anxiety, depression, sickness absence, psychotropic drugs, cohort study.*

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Abstract

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Sammanfattning

Psykisk ohälsa är vanligt förekommande hos vuxna, även inom den arbetande befolkningen. Trots att arbete generellt sett främjar hälsa, visar tidigare forskning att flera faktorer i arbetsmiljön kan bidra till ett försämrat psykiskt mående. Denna avhandling syftar till att undersöka om arbetsplatsmobbing, definierat som att upprepade gånger utsättas för negativa handlingar på arbetet under en längre tidsperiod, bidrar till förekomsten av depression och ångest hos individer i arbetsför ålder. För att besvara denna fråga används longitudinella enkät- och registerdata från Sverige och Danmark.

Avhandlingens **första studie** syftade till att fastställa de teoretiska och psykometriska egenskaperna hos ett mått för arbetsplatsmobbing. Resultaten visade att måttet fångade upplevelser som överensstämmer med den teoretiska förståelsen av mobbing i arbetslivet och att det i tillfredsställande grad överlappade med etablerade mått på arbetsplatsmobbing. Resultaten styrker måttets tillförlitlighet och motiverar användningen av måttet i avhandlingens efterföljande studier.

I avhandlingens **andra studie** undersöktes sambandet mellan arbetsplatsmobbing och ångest samt huruvida en god ledarskapskvalité kan mildra eventuell ångest efter utsatthet för mobbing. När utsatta individer jämfördes med icke-utsatta individer visade resultaten på ett dubbelriktat samband. Utsatthet för mobbing var förenat med en ökad risk för högre ångest vid ett senare tillfälle, samtidigt som högre initial ångest ökade risken för senare utsatthet för mobbing. I analyser där varje individ istället jämfördes med sig själv påvisades dock endast direkta, men inga långsiktiga, förändringar i ångest efter mobbingsutsatthet, och vi såg inget stöd för en omvänd association. Vidare återfanns inget stöd för att ledarskapskvalité modererade dessa samband.

I avhandlingens **tredje studie** undersöktes sambandet mellan arbetsplatsmobbing och sjukskrivning till följd av depressions- eller ångestdiagnoser, även här i båda riktningarna. Resultaten visade att individer som utsatts för arbetsplatsmobbing hade en ökad risk för sjukskrivning under de efterföljande två åren jämfört med icke-utsatta individer. Däremot återfanns inget tydligt stöd för att en sådan sjukskrivning ökade risken för senare arbetsplatsmobbing.

I avhandlingens **fjärde studie** undersöktes om arbetsplatsmobbing kan kopplas till en ökad risk för behandling med psykofarmaka. Analysen avgränsades till individer utan tidigare erfarenhet av arbetsplatsmobbing och utan nylig historik av psykofarmakaanvändning. Resultaten visade att utsatta individer hade en ökad risk att initiera behandling med psykofarmaka under de efterföljande två åren, där risken för uttag av antidepressiva läkemedel framträdde tydligast.

Sammanfattningsvis talar resultaten från avhandlingens studier för att arbetsplatsmobbing utgör en riskfaktor för depression och ångest. Att sambanden framträder konsekvent, även när hänsyn tas till sociodemografiska faktorer, tidigare psykisk ohälsa och andra arbetsmiljöfaktorer, stärker resultatens tillförlitlighet. Resultaten understryker vikten av förebyggande insatser mot arbetsplatsmobbing samt av att utsatta individer ges adekvat och tidig hjälp för att minska risken för senare psykisk ohälsa.

List of scientific papers

- I. Holmgren, R., Cowen Forssell R., Östberg V., Magnusson Hanson L.L. Assessing the validity of a single-item measure of exposure to workplace bullying: A mixed-methods study among Swedish workers [*Submitted manuscript*]
- II. Holmgren, R., Sørensen, K., Dalsager, L., Rugulies, R., Östberg, V., & Magnusson Hanson, L. L. (2023). Workplace bullying, symptoms of anxiety and the interaction with leadership quality – a longitudinal study using dynamic panel models with fixed effects. *Scandinavian Journal of Work, Environment & Health*, 49(1), 64-74.
<https://doi.org/10.5271/sjweh.4060>
- III. Holmgren, R., Grotta, A., Farrants, K., & Magnusson Hanson, L. L. (2024). Bidirectional associations between workplace bullying and sickness absence due to common mental disorders – a propensity-score matched cohort study. *BMC Public Health*, 24(744).
<https://doi.org/10.1186/s12889-024-18214-5>
- IV. Holmgren, R., Sørensen, J. K., Rugulies, R., Xu, T., Dalsager, L., Madsen, I. E. H., & Magnusson Hanson, L. L. (2026). Onset of exposure to workplace bullying and incident treatment with psychotropic medication – an emulated target trial with 25 309 Swedish and Danish employees. *Epidemiology and Psychiatric Sciences*, 35, e3.
<https://doi:10.1017/S2045796025100413>

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Introduction

For many, a significant portion of adult life is allocated to work, and the number of years in paid employment is likely to increase as policies aimed at extending working lives are implemented in many countries (OECD, 2015). Consequently, the work environment constitutes an important context that may shape workers' health, including their mental health. In the Nordic countries, like many others, mental health conditions among working adults are prevalent and appear to be increasing, resulting in considerable costs at both the individual and societal level (Blomgren & Perhoniemi, 2022; Dalsager et al., 2025). To reduce the burden associated with mental health conditions and to promote a healthy workforce, it is imperative to identify modifiable risk factors that can be targeted with preventive interventions. While being employed may, under favourable conditions, be health-promoting, work may also represent a source of distress, eventually contributing to poor mental health (Cortès-Franch et al., 2019; Harvey et al., 2017; Van Der Noordt et al., 2014).

A pathway through which work may influence mental health is via conditions in the psychosocial work environment, which refers to the conditions of work that arise from the interaction between individual workers and their surrounding social and organizational context (Siegrist & Li, 2024). Workers can be exposed to various work-related stressors, potentially associated with different psychological, physiological and/or behavioural responses, and a number of work-related stressors are linked to an increased risk of mental health conditions, including depression and anxiety (Niedhammer et al., 2021; Rugulies et al., 2023). One such stressor is workplace bullying, commonly defined as repeated exposure to negative social acts, to which the targeted individual has difficulty defending themselves (Einarsen et al., 2011). A growing body of research suggests that exposure to workplace bullying is associated with poor mental health, including depression and anxiety (Verkuil et al., 2015). Yet, it is debated whether this is due to actual bullying exposure or rather a result of pre-existing individual vulnerabilities, reverse causation, or other adverse characteristics of the surrounding work environment (Mikkelsen et al., 2021). Thus, clarifying the nature of this relationship can guide the prioritization of preventive interventions, inform policies and practices that promote employee health (Madsen & Rugulies, 2021), as well as advance the theoretical understanding of workplace bullying (Nielsen & Einarsen, 2018).

Drawing on longitudinal cohort data from Sweden and Denmark, this thesis aims to examine whether exposure to workplace bullying may contribute to mental health conditions, specifically depression and anxiety, among working adults, while also examining the validity of a workplace bullying measure used throughout the thesis. Through four rigorously designed studies, utilizing large national samples, this thesis seeks to provide more robust evidence regarding the role of workplace bullying for the development of mental health conditions.

The following chapter presents the overarching aim and specific objectives of the thesis. This is followed by a background chapter that first provides an overview of mental health conditions in the working-age population and how these may be shaped by the psychosocial work environment, before zooming in on workplace bullying. In this section, the phenomenon is described, and its associations with mental health outcomes are reviewed, from both theoretical and empirical perspectives. Subsequent chapters present the methods used in the four papers that make up the empirical part of this thesis, summarize their main findings, and reflect on major methodological issues. Finally, the findings are discussed in the context of the broader literature, considering their implications for practice and for future research.

Aim and objectives

The overarching aim of this thesis is to examine whether exposure to workplace bullying contributes to mental health conditions in the general working population. The aim is pursued through the following three objectives:

- I) To investigate the theoretical and psychometric properties of the measure assessing exposure to workplace bullying used in this thesis (Paper I).
- II) To assess concurrent, prospective, and reverse associations between exposure to workplace bullying and various indicators of depression and anxiety (Papers I–IV).
- III) To consider the role of other psychosocial working conditions (i.e. leadership quality, job demands, and decision authority) as potential effect modifiers or confounders for these associations (Papers II–IV).

Background

Mental health conditions in the working-age population

Mental health is intrinsic to all humans, and considered a vital part of an individuals' health (World Health Organization, 2018). According to the World Health Organization (WHO), mental health exists on a continuum, and can be defined as “*a state of mental well-being that enables people to cope with the stresses of life, to realize their abilities, to learn well and work well, and to contribute to their communities*” (World Health Organization, 2022b). Mental health conditions, a related concept, instead refer to a range of health conditions that involve significant alterations in cognitions, behaviours, and/or emotions (American Psychiatric Association, 2022; World Health Organization, 2018, 2022b). While mental health conditions are often associated with poor mental health and reduced well-being, the concepts mental health and mental health conditions are separate, meaning that the presence of one does not necessarily imply the absence (or low levels) of the other (World Health Organization, 2022b).

Mental health conditions, as defined by WHO, include both diagnosable mental disorders, subclinical states thereof (e.g. when an individual experiences symptoms of mental disorders that are below clinical thresholds for diagnosis), and mental conditions not officially recognized as mental disorders (e.g. burnout) (World Health Organization, 2022b). When symptom patterns meet criteria outlined in diagnostic manuals (such as the International Statistical Classification of Diseases and Related Health Problems [ICD] or the Diagnostic and Statistical Manual of Mental Disorders [DSM]), they can be described and diagnosed as mental disorders. Traditional diagnostic systems rely on a categorical classification, separating individuals as either having or not having a disorder. However, this dichotomized approach has been challenged as it might not fully reflect the dimensional or spectrum-like nature of mental health conditions (Kendler, 2016; Krueger et al., 2018; Stein et al., 2021). Still, categorical distinctions remain standard in clinical practice.

Similar to WHO's notion of mental health conditions, the Swedish National Board of Health and Welfare (2024) uses the term mental ill-health as an umbrella term encompassing both psychiatric conditions (i.e. diagnosable mental disorders and neurodevelopmental disorders) and mental distress. The latter refers to conditions that do not meet the criteria for a mental disorder but may still involve significant symptoms or functional impairment.

The most prevalent mental disorders in adults are depressive disorders and anxiety disorders. At times, these are collectively referred to as common mental disorders (Kendrick & Pilling, 2012; World Health Organization, 2017), which may also include stress-related disorders and/or substance use disorders (Glozier, 2002; Steel et al., 2014).

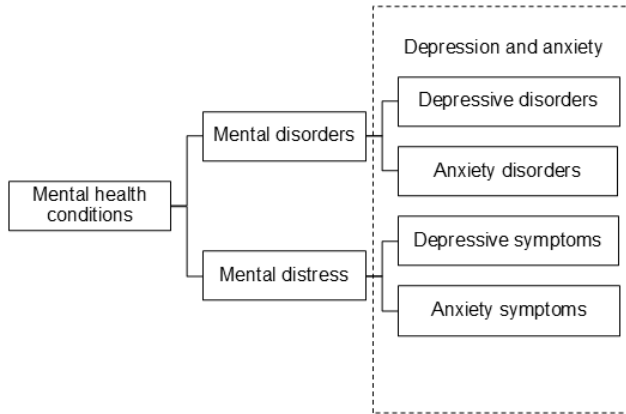
Depressive disorders comprise various subtypes, with major depressive disorder being the most prevalent (World Health Organization, 2017). According to diagnostic manuals (i.e. ICD-11, DSM-5), depressive disorders are characterized by depressed mood and/or loss of interest in activities that are typically experienced as joyful by the individual, accompanied by one or more of several other symptoms such as exhaustion, feelings of guilt and hopelessness, or significant changes in sleep patterns and/or appetite (World Health Organization, 2022a). Symptoms can range from mild to severe but need to be present for at least two weeks and significantly impair functioning.

The core symptoms of anxiety disorders (e.g. generalized anxiety disorder, panic disorder, social anxiety disorder) are excessive fear and anxiety (World Health Organization, 2022a). These emotional and cognitive symptoms go together with alterations in behaviours. In general, symptoms need to have been manifest for several months before a diagnosis can be made (World Health Organization, 2017). As with depressive disorders, the symptom level can vary, but it needs to be associated with impaired functioning. Unlike other mental disorders, which are typically diagnosed based on symptoms alone, a subgroup of anxiety disorders are defined by their clear link to an identifiable stressor or a traumatic event (e.g. post-traumatic stress disorder, adjustment disorder, emerging as a new grouping in ICD-11; see Maercker et al., 2013) (World Health Organization, 2022a).

There is high comorbidity between depressive disorders and anxiety disorders. This can to some extent reflect diagnostic overlap but may also point to shared underlying latent factors and shared aetiology (Pasman et al., 2023; Plana-Ripoll et al., 2019). Moreover, depression and anxiety might also influence each other over time, most often with anxiety preceding depression (Merikangas et al., 2003; ter Meulen et al., 2021).

This thesis examines various indicators of mental health conditions in adult workers (outlined in detail in the methods section), ranging from subclinical states to diagnosed depressive and anxiety disorders. If not otherwise stated, the terms depression and anxiety will be used when referring to this full spectrum. Figure 1 presents a schematic overview of the relationships between key constructs within the broader concept of mental health conditions, as used throughout this thesis.

Figure 1. Schematic overview of how constructs within the concept of mental health conditions are related.



Note. The figure is limited to display constructs and terminology used throughout this thesis.

Both mental distress and mental disorders may debut early in life (Public Health Agency of Sweden, 2023; World Health Organization, 2024), and many mental disorders appear already in adolescence or early adulthood (Solmi et al., 2022). There is some evidence suggesting that among mental disorders, depressive disorders and certain anxiety disorders, such as generalized anxiety disorder and post-traumatic stress disorder, tend to have a later onset, with a recently estimated median age of onset around 30 years (Pasman et al., 2023; Solmi et al., 2022). Depressive episodes can vary greatly in length. For example, a Dutch population-based study estimated the average length of a major depressive episode to nearly 11 months, and while around half of the cases had recovered within 6 months, 12% had not recovered after 36 months (ten Have et al., 2017). Anxiety disorders are typically considered more chronic than episodic (World Health Organization, 2017), with episodes enduring longer and recovery rates being lower, in comparison to depressive episodes (ten Have et al., 2021). Further, it is common for both depression and anxiety to be recurrent (Pasman et al., 2023; ten Have et al., 2021).

In the Scandinavian countries, treatment of depression and anxiety is predominantly managed in primary health care (Lundberg et al., 2022; Pasman et al., 2023; Sundquist et al., 2017). Depending on diagnosis and degree of severity, treatment recommendations include therapeutical and/or pharmacological options (Swedish National Board of Health and Welfare, 2021). While research has suggested that patients generally prefer psychotherapeutic treatments (McHugh et al., 2013), pharmacological treatments, either alone or in combination with psychotherapy, remain more commonly used in practice (Cullen et al., 2023). A Swedish study from 2023 found that, among adults diagnosed with depression- and anxiety disorders within primary health care

in Stockholm, one third received pharmacological treatment only, one sixth received psychotherapy only, and around 40% received both (Cullen et al., 2023).

Prevalence and burden of depression and anxiety

The global point prevalence of mental disorders for adults of working age (20-64 years) is estimated at 16-17%, and nearly one in three adults is estimated to experience a common mental disorder (i.e. anxiety-, depressive-, or substance use disorder) at some point in life (GBD 2021 Diseases and Injuries Collaborators, 2024; Steel et al., 2014). Even though this figure is high, it has been challenged as potentially underestimating the true lifetime prevalence (Moffitt et al., 2010).

In 2021, the global point prevalence for depressive and anxiety disorders specifically was estimated at approximately 5-6% respectively, across all ages (GBD 2021 Diseases and Injuries Collaborators, 2024). This is on par with reported prevalence levels in the Swedish and Danish adult populations (Höglund et al., 2020; Weye et al., 2023). Notably, women are approximately twice as likely to develop depressive and anxiety disorders than men (Altemus et al., 2014; Kessler et al., 1994).

In comparison with mental disorders, the experience of mental distress is more common. According to the Swedish national statistics from 2022, around two in five adults reported being disturbed by feelings of nervousness, worry, and anxiety, while one in seven reported feeling stressed (Public Health Agency of Sweden, 2023). Again, women were more likely than men to report mental distress (Public Health Agency of Sweden, 2023). It should be noted that estimating the exact prevalence of mental health conditions is challenging, as different approaches come with different potential sources of error (as will be discussed later in this thesis).

The burden of adult mental health conditions in general, and particularly that of depression and anxiety, is evident on multiple levels, impacting individual lives, workplaces, and society (Christensen et al., 2020; Lundberg et al., 2022). A substantial proportion of the non-fatal health loss globally is attributable to depressive and anxiety disorders. The 2021 Global Burden of Disease study ranked depressive disorders and anxiety disorders as the second and sixth leading causes of total years lived with disability (GBD 2021 Diseases and Injuries Collaborators, 2024). Individuals with common mental disorders often experience reduced quality of life and are more likely to be excluded from the labour market at different stages in their working lives (Alonso et al., 2004). Depressive and anxiety disorders are major, and increasing, causes of sickness absence in Scandinavia (Blomgren & Perhoniemi, 2022; Swedish Social Insurance Agency, 2020b), in turn contributing to individual income loss, reduced organizational productivity, and societal costs through associated benefits. Around half of all ongoing sickness absence

spells in Sweden are attributable to mental disorders, with common mental disorders accounting for approximately 90 to 95% of these cases (Swedish Social Insurance Agency, 2020a, 2020b). In Denmark, major depressive disorder was recently ranked as the most costly mental disorder, in terms of both national health care expenditure and total income loss (Christensen et al., 2022). Over the past 20 years, antidepressant medication use, which to some extent might be indicative of mental health conditions, has increased globally, as well as in the Nordic countries, with Sweden showing the highest prevalence within this region (Bojanić, 2024; Brauer et al., 2021). In 2023, around 8% of all Swedish men and 15% of all Swedish women received at least one prescription of antidepressants. In Denmark, the corresponding figures were 6% for men and 10% for women (Nomesco-Nososco, 2025).

Taken together, these figures clearly underline the significant public health impact of depression and anxiety and highlight the importance of understanding their underlying causes and risk factors. Such knowledge is crucial for developing effective preventive interventions.

Aetiology of depressive and anxiety disorders

There is no single cause of mental disorders. Rather, their onset and course are influenced by multiple, most likely interacting, psychological, biological, social, and environmental factors (Arango et al., 2021; Kohler et al., 2018). Genetic liability plays some role, with studies suggesting heritability estimates in the range of 30-50% for depressive and anxiety disorders (Kendall et al., 2021; Meier & Deckert, 2019). Likewise, individual life situations, shaped by broader structural conditions, influence the risk of developing mental disorders (Kirkbride et al., 2024). Consistent evidence has shown that early life and childhood adversities, as well as poor socioeconomic circumstances, are associated with the development of common mental disorders (Kirkbride et al., 2024). More recently, growing attention has been directed to the role of loneliness and social isolation in the development of mental health conditions (Kirkbride et al., 2024). Furthermore, stressful life events, due to episodic (e.g. interpersonal loss) and/or chronic (e.g. chronic disease) stressors have been linked to an increased risk of mental disorders, particularly depressive disorders (Clarke & Currie, 2009; Hammen, 2018; Kendler & Gardner, 2016; Miloyan et al., 2018). It has also been suggested that encountering serious difficulties at work may be a stressful life event that can increase the risk of depression (Kendler et al., 2002). One suggested mechanism in which demanding life events leave marks that may contribute to the development of mental disorders is through stress (Hammen, 2015; McEwen, 2003).

The relevance of stress

Stress may be viewed as both a subjective experience and a physiological response to encountering a challenge or demand (Siegrist & Li, 2024). Importantly, the stress response is believed to be largely influenced by the appraisal (i.e. cognitive evaluation) of the situation. This includes both a primary appraisal concerning the evaluation of the situation as threatening or not, and a secondary evaluation of one's perceived ability to handle the situation (Lazarus & Folkman, 1987). According to Lazarus and Folkman (1987), demands are likely to be negatively appraised when they are deemed unexpected or unpredictable, deviate from our beliefs and expectations about how the world is organized, and are prolonged in nature. The secondary appraisal is typically influenced by individual competencies and by the material and social resources that one has access to (Folkman & Lazarus, 1984). Some stress theories even go as far as stating that it is resource loss, or threats thereof, that triggers stress reactions (Hobfoll, 1989). A challenge or demand that is negatively appraised, meaning that it is evaluated as exceeding or straining one's capacity to cope with it, may be referred to as a stressor (Siegrist & Li, 2024).

When faced with stressors, the human body responds by mobilizing necessary physiological resources (a process labelled allostasis), including activation of the immune, metabolic, cardiovascular, and endocrine systems (McEwen, 2000). Once the situation is no longer perceived as challenging, a period of recovery follows, allowing the body to return to equilibrium (homeostasis). As such, stress is a normal and necessary part of everyday life, as it allows individuals to respond and adapt to their surroundings. However, following the allostatic load model, repeated or chronic stress, without sufficient recovery, results in a wear and tear of organs and tissues in the body due to sustained activation of the physiological stress response (McEwen, 2000). The accumulation of exposure to stress risks to negatively affect several systems in the body, in turn increasing the risk of developing both physical and mental illnesses (McEwen, 2000).

Work and mental health conditions

Most people spend a large portion of their adult life in paid work. As such, work can be viewed as a routine activity that brings structure to daily life while also providing basic financial security. Additionally, work may contribute to a sense of purpose and belonging, with the workplace potentially, and under certain circumstances, providing an arena for personal development and social relationships (Waddell et al., 2007). Accordingly, for many, being employed, compared to being unemployed, is beneficial for health (Cortès-Franch et al., 2019; Picchio & Ubaldi, 2024; Van Der Noordt et al., 2014). However, the

nature and content of work is heterogenous and can involve both health-promoting factors and factors that contribute to poor health. Notably, these aspects can vary between individuals and workplaces, but also systematically across occupations and social strata, reinforcing the social gradient in health and mortality (Marmot & Wilkinson, 2006). While the early stages of occupational health research primarily studied the physical, chemical, and biological work environment in relation to physical health outcomes (Gochfeld, 2005), the scope of research has since expanded to include how health is influenced by the content and organization of work, as well as from social relationships and interactions at work (Boot et al., 2024). This body of research places particular emphasis on the influence of these factors on mental health conditions, while also acknowledging their influence on worker's physical health. The following section presents both theoretical models and empirical evidence regarding the psychosocial work environment and its relation to health, with particular attention to its association with mental health conditions.

The psychosocial work environment

The term “psychosocial work environment” is commonly used when describing the interplay between social and psychological working conditions and how these conditions are experienced by the workers, individually and/or collectively (Marmot & Wilkinson, 2006; Siegrist & Li, 2024). The psychosocial work environment thus encompasses several dimensions, both the “actual” (i.e. material or manifest) working conditions as well as the employees' perceptions of these conditions. These dimensions may both vary at different levels within organizations, such as by occupation, type of contract, work group, or at the individual level. Consequently, working in the same workplace does not necessarily mean having the same psychosocial work environment, even for workers in identical positions or performing the same tasks, as objective conditions may vary and individual experiences are likely to differ.

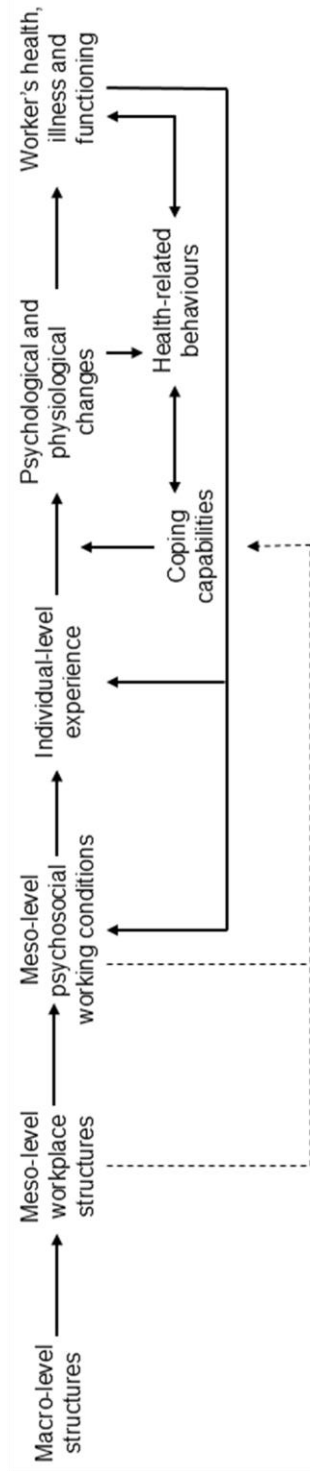
One of the earliest researchers to use the term “psychosocial work environment” was Lennart Levi, a medical doctor and stress researcher, who already in 1971 discussed the importance of stress for health (Levi, 1971). More recently, Rugulies (2019) proposed a conceptual framework for research on the psychosocial work environment and health, where he suggested the psychosocial work environment to be “an intermediate step in a causal pathway linking economic, social and political structures with health and illness through psychological and psycho-physiological processes” (p. 3). Specifically, the framework proposes that macro-level structures (e.g. justice systems, economic and social security structures) shape workplace structures (e.g. employment contracts), which in turn influence the psychosocial working conditions (e.g. job demands, social relations, work organization) that will be experienced by the workers, individually and collectively, influencing health and

illness through both behavioural and psycho-physiological changes. While the framework emphasizes the primary direction of causality, Rugulies indeed states that a reverse pathway is also plausible (health and illness influencing psychosocial working conditions and individual-level experiences). In later developments of the model, these reciprocal pathways have been made more explicit, and coping capabilities have been added into the model (Siegrist & Li, 2024). Figure 2 presents an adapted version of Rugulies' framework made for this thesis, incorporating these latter modifications. Here, coping capabilities refers to the individuals' access to and use of psychological, social, and material resources. As indicated by the dashed arrow (my addition), coping capabilities are thus likely to be partially influenced by one's overall working situation.

While conceptually clear in Rugulies' framework, the distinction between meso-level psychosocial working conditions and individual-level experiences becomes more complex in empirical research, where these factors are often intertwined. In many cases, psychosocial working conditions are assessed using self-administered questionnaires, ultimately relying on the perceptions of individual workers, also when the aim is to capture factors at the organizational-, workplace-, or work group level (Siegrist & Li, 2024). Yet other types of assessments (i.e. job exposure matrices) measure these conditions on the level of the occupation, thereby disregarding potential within-occupational heterogeneity (Peters, 2020).

In the literature, the terms "psychosocial hazards", "psychosocial risk factors", "psychosocial work stressors", or simply "work stressors" are often used to refer to the collection of psychosocial working conditions that are likely to increase the risk of poor health (Härma et al., 2006; International Labour Organization, 1984; Leka & Jain, 2024). In this thesis, these terms will be used interchangeably.

Figure 2. Conceptual framework for research on the psychosocial work environment and health.



Note. Figure adapted from Rugulies (2019), original figure licensed under CC BY 4.0. Dashed arrows indicate additions by the author.

Theoretical models linking the psychosocial work environment to (mental) health conditions

To understand how the psychosocial work environment influences health, a number of theoretical models have been developed, and empirically tested. Central to many of them is the notion of work stress, often assumed to arise from an imbalance between the work situation or certain work characteristics and one's perceived ability to handle these (Boot et al., 2024; Siegrist & Li, 2024).

One of the most influential theoretical work stress models is the job demand-control model (JD-C), proposed by Karasek (1979) and later by Karasek and Theorell (1990). According to this model, mental strain may arise as a result of two types of working conditions: the level of psychological demands that the work requires, and the level of individual control over those demands, including the two subdimensions skill discretion and decision authority. In particular, the model proposes that the combination of high levels of demands with low levels of control (so-called "job strain") is considered most harmful to health. Later, social support was added as a third dimension to the model (Johnson & Hall, 1988), with the assumption that high demands, low control, and low levels of social support ("iso-strain") would be the strongest predictor of stress-related ill-health.

Another widely recognized model is the effort-reward-imbalance model (ERI), presented by Siegrist in 1996. This model introduced a more sociological and social psychological perspective on work stress and imbalance by highlighting the importance of social reciprocity for workers' health. As the name of the model indicates, reciprocity is failed when the efforts that workers put into their work outweigh the rewards, whether financial, status-related, and/or socioemotional, that they receive in return. Such an imbalance is thought to affect self-esteem, induce negative emotions, and activate psychobiological stress responses (Siegrist, 1996).

An additional set of theories on work and health stems from the field of organizational psychology, some of which were originally developed to explain job-related outcomes such as performance, motivation, and employee engagement, but have later been extended to also account for health-related outcomes. This includes the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2014), which among other hypotheses postulates that all characteristics at work can be classified as either resources or demands, that high demands and low resources increase the risk of poor health, and that resources might buffer the negative impact of high demands on health. It further includes the theory of organizational justice (Greenberg & Colquitt, 2005), stating that perceived injustice at work (whether distributional, procedural and/or relational) can impair health through increased stress and behavioural changes (Elovainio & Virtanen, 2020).

Results from multiple meta-analyses and umbrella reviews have supported that factors described in the presented theoretical models (both their individual and joint components) contribute to an increased risk of subsequent poor health and well-being outcomes (Kivimäki et al., 2012; Lesener et al., 2019; Niedhammer et al., 2021), including depression (Madsen et al., 2017; Rugulies et al., 2023) and mental health-related sickness absence (Duchaine et al., 2020). Moreover, other factors in the psychosocial work environment, not directly tied to a single theoretical framework and often assessed via broader instruments/frameworks (e. g. the Copenhagen Psychosocial Questionnaire [COPSOQ]), have been proposed to increase the risk of mental health conditions (Burr et al., 2010). This includes long working hours (although with mixed findings) (Niedhammer et al., 2021; Rugulies et al., 2021), low levels of positive leadership behaviours (Sørensen et al., 2024), job insecurity (Blomqvist et al., 2020), as well as exposure to interpersonal stressors at work (Niedhammer et al., 2021). Whether the mentioned associations represent causal relationships is, however, still debated (Mikkelsen et al., 2021; Rugulies et al., 2023). In a review on psychosocial working conditions and depressive disorders, Mikkelsen et al. (2021) argued that, among others, poor adjustment for confounding and high statistical uncertainty prohibited any conclusions regarding causality.

Several of the theoretical models presented above incorporate aspects of negative social interactions at work. In the ERI-model they may be represented as a lack of respect or appreciation, in the JD-R model as a type of job demand, and in the organizational justice theory as relational injustice. A theory that addresses negative social interactions at work more explicitly is the Stress as Offense to Self-framework (SOS). According to SOS, workplace derogatory treatment risk to threaten one's social self-esteem and induce stress (Semmer et al., 2007; Semmer, 2020; Semmer et al., 2019). In addition, there is a substantial body of research that examines such negative social interactions as primary stressors in their own right (Dhanani & Bogart, 2026). The following sections will zoom in on workplace bullying as one of these.

Workplace bullying

The conceptual understanding of workplace bullying emerged in Europe in the late 1980s with the works of Swedish psychologist Heinz Leymann. Leymann borrowed the term “mobbing” from school research (Olweus, 1978, 1993) to describe a phenomenon of repeated hostile behaviour at work, involving some type of power imbalance between the perpetrator(s) and target(s) (Leymann, 1990). Earlier, the American anthropologist and psychiatrist Carroll Brodsky had released the book “The harassed worker”, in which he described a similar concept (“harassment”) consisting of repeated and enduring mistreatment at work (Brodsky, 1976). These pioneering works prompted

an increased interest, both from the public and the research community, in what we today refer to as workplace bullying¹. Most initial research emerged from the Scandinavian countries, with a clear foundation in work and organizational psychology (Einarsen, 2000; León-Pérez et al., 2021). Over time, the research field has expanded, both geographically and over disciplines, with research being conducted in a variety of fields, including medicine, sociology, public health, and occupational epidemiology (Fevre, 2021).

Characteristics of workplace bullying

In the original work of Leymann (1990), he described mobbing as “hostile and unethical communication which is directed in a systematic way by one or a number of persons mainly toward one individual” (p.120) and further stated that “these actions take place often (almost every day) and over a long period (at least for six months)” (p.120). Since then, several definitions have evolved, with the following definition, suggested by Einarsen and colleagues (2011), being among the most frequently used:

Bullying at work means harassing, offending, or socially excluding someone or negatively affecting someone’s work. In order for the label bullying (or mobbing) to be applied to a particular activity, interaction or process, it has to occur repeatedly and regularly (e.g. weekly) and over a period of time (e.g. about six months). Bullying is an escalating process in the course of which the person confronted ends up in an inferior position and becomes the target of systematic negative social acts. A conflict cannot be called bullying if the incident is an isolated event or if two parties of approximately equal strength are in conflict. (p. 22)

Although no universally accepted definition of workplace bullying exists, three key components, that can be traced back to Leymann’s initial work, still lie at the core of how we understand workplace bullying today, namely negative social acts; enduring and repetitive exposure; and power imbalance (Notelaers & Van Der Heijden, 2021).

Starting with the first component, workplace bullying constitutes negative social acts or behaviours. These acts are often described as unwanted and potentially harmful to the exposed individual (Hansen et al., 2020; Leymann, 1990). Further, it has been suggested that such acts or behaviours tend to violate general norms and fundamental social principles regarding respect and interaction (Ramsay et al., 2011). Most commonly, they are acts of a psychological, rather than physical, nature (Einarsen et al., 2011). Different catego-

¹ Although the term “workplace bullying” is most used today, some scholars prefer to use the words mobbing or harassment. In most cases, these terms refer to the same phenomenon albeit originate from different contexts and/or languages (Einarsen et al., 2011).

rizations have been used to describe bullying behaviours, for example distinguishing between subtle or indirect and overt or direct behaviours (e.g. social exclusion versus humiliation in front of others) (Nielsen et al., 2010), or between person-related, work-related, and physically intimidating acts (e.g. gossiping versus giving someone an unreasonable work load versus shouting at someone) (Einarsen et al., 2009). Empirical data, however, suggests that these categories are highly correlated (Notelaers et al., 2018). These acts have in common that they are relational in nature, they require a perpetrator (or several) and a target/recipient. The target can be at any level within the organization and the perpetrator(s) can be someone within the organization, such as a colleague, supervisor, or subordinate, but may also be external to it, such as clients, customers, or students (D’Cruz & Noronha, 2019). It has been suggested that the most common scenario is that of an employee being bullied by their supervisor or their colleagues (Ortega et al., 2009). Unlike many psychosocial stressors in the workplace that may affect multiple employees simultaneously (e.g., shift work, job strain, emotional demands), the negative acts associated with workplace bullying typically involve the “singling out” of an individual, that is, treating someone differently from others (D’Cruz & Noronha, 2019). It is also worth noting that most definitions of workplace bullying, including the one by Einarsen and present above, do not rely on the intent behind the behaviour(s).

Secondly, workplace bullying is not merely defined by the nature of the negative acts or behaviours, but rather by the repeated exposure to such acts (or their consequences) over a longer time period (Einarsen et al., 2011). Consequently, some negative acts alone, such as being assigned a tight deadline, might not appear particularly harmful to an outside observer, if unaware of the broader pattern of mistreatment that these acts are part of. However, while persistence has been pointed out as a key characteristic of workplace bullying (e.g. weekly exposure for at least six months), operationalizing this criterion can be challenging, as also isolated acts may affect the targeted individual repeatedly (e.g. being excluded from an email-list and thus repeatedly not being given important information) and there is currently no consensus on for how long and with what frequency these acts need to happen in order for it to be labelled as bullying (D’Cruz & Noronha, 2019; Notelaers & Van Der Heijden, 2021; Notelaers et al., 2018). Empirical evidence shows that workplace bullying is typically a long-lasting experience, with a large share of those affected reporting exposure lasting more than a year (Einarsen et al., 2011). Workplace bullying is further often described as an escalating process where the negative social acts are assumed to intensify over time (Nielsen & Einarsen, 2018).

The third and final key component of workplace bullying is power imbalance, which refers to the victim being in an inferior position to the instigator(s) and/or feeling unable to defend themselves (Einarsen et al., 2011). This im-

balance may reflect a formal organizational structure, such as when a supervisor bullies a subordinate, or may stem from informal power, such as social status, competence, or access to resources. The power imbalance can either be present from the outset or develop as a result of the ongoing negative acts themselves (Einarsen et al., 2011). It has been suggested that inability to defend oneself is inherent in the repeated and prolonged exposure to negative social acts (acts one would otherwise want to stop), and that a power imbalance does not necessarily need to be expressed through explicit feelings of defencelessness (Nielsen, Gjerstad, et al., 2017).

In addition, with emerging forms and arrangements of work, including increased digitalization and remote work, it is important to clarify that workplace bullying does not necessarily need to occur only in the physical workplace (D’Cruz & Noronha, 2019). Instead, it should be understood as occurring within the context of work.

In this thesis, exposure to workplace bullying is defined as workers' experience of repeated and prolonged exposure to negative social acts, occurring in the context of work, that are difficult to defend against. Further, the focus is primarily on workplace bullying enacted by internal sources (i.e. colleagues, subordinates, and/or supervisors). Acknowledging both the overlap and distinctiveness of face-to-face bullying and cyberbullying (Farley et al., 2016; Forssell, 2016; Platts et al., 2023), this thesis does not aim to restrict its focus to any specific form of workplace bullying.

Distinguishing workplace bullying from other forms of workplace mistreatment

Workplace bullying is one form of mistreatment that workers may encounter. Unfortunately, individuals also risk facing other negative interpersonal interactions at work. Table 1 lists an overview of several selected constructs that often fall under the umbrella term workplace mistreatment (Dhanani & Bogart, 2026; Dhanani et al., 2021). Note that this list is not exhaustive and that other terminology can appear in the mistreatment literature.

Table 1. Selected forms of workplace mistreatment.

Mistreatment construct	Description
Discrimination	Direct or indirect prejudiced distinction based on discriminatory grounds (International Labour Organization, 2019)
Incivility	Subtle disrespectful behaviour that violates workplace norms. May or may not be intended to harm the target (Andersson & Pearson, 1999)
Interpersonal conflict	Mutually stressful interaction involving disagreement between workers (Hershcovis, 2011)
Ostracism	Being excluded or neglected (Ferris et al., 2008)
Sexual harassment	Unwanted behaviour of a sexual nature (International Labour Organization, 2019)
Violence/threats of violence	Aggressive instances involving direct physical assaults or threats thereof (Barclay & Aquino, 2011)

Note. Table adapted from Dhanani et al. (2021) and expanded with additional constructs.

In terms of defining features (e.g. intensity and frequency, power dynamics, perpetrator position, and intent) these constructs have both conceptual similarities and differences to workplace bullying (Hershcovis, 2011). For example, whereas interpersonal conflict is characterized as a mutually stressful interaction, workplace bullying is defined by an imbalance of power between those involved. Furthermore, repeated and sustained exposure to negative behaviours is a defining feature of workplace bullying, whereas none of the other forms of mistreatment makes any assumptions about persistence. However, when coupled with power imbalance, systematic exposure to other forms of mistreatment, each involving inherently negative acts, could be considered as exposure to workplace bullying. Moreover, as noted by Dhanani and Bogart (2026) and by others (Hershcovis, 2011; Notelaers et al., 2018), the theoretical differences between the mistreatment constructs are not always apparent in their operationalizations. In addition, several constructs are measured using partly the same, or very similar, items (Hershcovis, 2011; Walsh & Magley, 2014). This might also explain why different forms of mistreatment at work to a large extent predict similar outcomes (Clausen et al., 2012; Dhanani & Bogart, 2026; Hershcovis, 2011). However, previous work has also demonstrated empirical differences between the constructs, such as different behavioural content, prevalence rates, associated outcomes, and severity of harm (Baillien et al., 2017; Dhanani & Bogart, 2026; Dhanani et al., 2021; Hershcovis, 2011).

Operationalizing and measuring exposure to workplace bullying

There is currently no established gold standard for measuring workplace bullying (Notelaers & Van Der Heijden, 2021). Nevertheless, when the interest is in bullying from the target's perspective, research primarily relies on two main approaches, commonly referred to as the self-labelling method and the behavioural experience method (Nielsen et al., 2010). Both approaches rely on individuals' perceptions, commonly collected via self-reported items in questionnaires. In the self-labelling method, the study participants are asked whether they have been (or are currently) bullied at work, usually referring to the past 6 or 12 months. Oftentimes this question is accompanied by a formal definition of workplace bullying, such as the one proposed by Einarsen et al. (2011) presented on page 16. Typically, response alternatives are provided that refer to how often exposure has occurred, ranging from never to more frequent occurrence (i.e. weekly or daily exposure). Sometimes, the participants are also asked to indicate by whom they were bullied.

In the behavioural experience method, respondents are instead provided with a list of negative behaviours and asked to rate how often they have been exposed to each of these acts, during a given time frame. One of the most commonly used behavioural inventory scales is the Negative Acts Questionnaire Revised (NAQ-R), assessing the frequency of exposure to 22 different negative social behaviours over the last 6 months, covering three forms of bullying acts: person-related, work-related, and physically intimidating acts (Einarsen et al., 2009). Response options range from never to daily.

In both the self-labelling and the behavioural experience method, responses can either be treated as continuous variables or used to classify individuals as exposed or unexposed to workplace bullying based on a predetermined cut-off, such as a threshold frequency or sum score. The self-labelling method enables exposure classification based on the experience reported by the individual (e.g. treating all individuals answering affirmatively to the question as exposed to workplace bullying). In contrast, the behavioural experience method relies on the researchers' definition of bullying to classify exposure, regardless of whether individuals perceive themselves as being bullied or not. As such, it is often argued to carry less risk of being influenced by factors such as individual cognitive and emotional processing, mood, and previous experiences (Notelaers & Van Der Heijden, 2021). National cut-off scores for NAQ-R have been established in several countries (Notelaers & Einarsen, 2013), including Sweden (Rosander et al., 2024), yet also other operationalizations have been recommended, including setting a criterion of at least weekly exposure to a specified number of behaviours (Notelaers & Van Der Heijden, 2021). In both measurement approaches, bullying is sometimes further classified as being frequent or severe versus occasional or less severe.

The self-labelling method and the behavioural measurement method are not necessarily mutually exclusive. Rather, some researchers have argued that it

may be best to include both these approaches when measuring exposure to workplace bullying, as they do not fully overlap, and as such have been suggested to partly capture different aspects of the bullying phenomena (Einarsen et al., 2009; Salin, 2001).

The measurements of workplace bullying used in this thesis will be introduced and discussed on page 47.

Prevalence of exposure to workplace bullying

In a recent meta-analysis, based on 134 independent samples from 62 countries (N=178 598), the estimated average prevalence of exposure to workplace bullying was 16% (95% CI: 13-18%), with a slightly lower prevalence (14%, 95% CI: 10-18%) observed when restricting the exposure time frame to the past six months (Dhanani et al., 2021). This aligns with prior meta-analytic findings, reporting average prevalence levels of 14.6% (Nielsen et al., 2010). When excluding convenience samples, the estimated prevalence levels are generally reduced to around 11-12% (Dhanani et al., 2021; Nielsen et al., 2010). Official statistics from the Work Environment Authorities in Sweden and Denmark suggest that the 12-month prevalence of workplace bullying is somewhat lower than these figures. In Sweden, levels have remained relatively stable over the past decade at approximately 7–9%² (Swedish Work Environment Authority, 2022b). Here, workplace bullying is neither assessed through self-labelling nor by behavioural inventories but by asking about exposure to personal persecution at work (which is also how exposure to workplace bullying is mainly assessed in this thesis). In Denmark, where workplace bullying is assessed through the traditional self-labelling approach, the corresponding numbers have ranged from 9% to 12%, with a temporary decline (7.7%) noted during the COVID-19 pandemic (Danish Working Environment Authority, 2019). The prevalence of workplace bullying appears to be relatively similar across sectors and occupations, although few studies have examined this using representative samples. There is a slight tendency for bullying to occur more frequently among unskilled workers, in larger organizations, and in workplaces where one gender is predominantly represented (Lange et al., 2019; Niedhammer et al., 2023; Ortega et al., 2009).

However, estimating the prevalence of workplace bullying is challenging, partly given the heterogeneity in operationalizations and measurements. Notably, even within the same study samples, prevalence rates seemingly vary according to choice of measurement approach (Rosander & Blomberg, 2019). In general, studies that assess exposure to workplace bullying via the behavioural experience method yield higher prevalence rates than studies relying on

² Since 2024, The Swedish Work Environment Authority no longer monitors exposure to workplace bullying. Instead, they monitor exposure to workplace victimization (Swedish translation: kränkande särbehandling).

the self-labelling approach (Dhanani et al., 2021; Nielsen et al., 2010). However, according to Nielsen et al. (2010) the highest prevalence rates were found in studies that used the self-labelling approach but did not include a formal definition of workplace bullying, which could reflect a discrepancy in the understanding of workplace bullying between researchers and respondents. Notably, these differences disappeared when the analysis was limited to Scandinavian samples.

Risk factors for workplace bullying

There is still relatively little synthesized knowledge on specific risk factors for workplace bullying (see for example Feijó et al., 2019, Moayed et al., 2006, and Nielsen, Glasø et al., 2017). Up until today, most research has focused on identifying risk factors either related to working conditions or to individual characteristics of the exposed workers. Already in Leymann's seminal works on workplace bullying, factors such as high job demands, unclear roles, and poor or absent leadership, were suggested to create conditions (high-stress environments and high strained-workers) that raise risk for bullying behaviours. In accordance with the work environment hypothesis, Leymann argued that these organizational aspects, rather than certain individual characteristics of targets or perpetrators, explain the occurrence of workplace bullying (Leymann, 1990; Leymann, 1996). Still, much research has examined how exposure to workplace bullying varies according to individually tied characteristics. It seems plausible that the occurrence of workplace bullying cannot be explained through single factors, but rather be understood as an interplay of multiple factors, situated at both the individual and organizational levels (Branch et al., 2018). Furthermore, it may be that different risk factors are associated with distinct mechanisms, and while some may account for the conditions that enable bullying to occur, others may better explain why a particular individual becomes targeted.

In 2019, Feijó et al. carried out a systematic review of 51 epidemiological studies addressing both individual and organizational risk factors for workplace bullying (including both cross-sectional and longitudinal research). Even though the heterogeneity in terms of studied risk factors and methodology made it difficult to synthesize the evidence into coherent risk estimates, the authors concluded that a poor work environment was consistently associated with an increased risk of workplace bullying. This included factors such as low salary, non-standard contract types, shift work, organizational change, low procedural justice, poor psychosocial safety climate, role conflict and role ambiguity, as well as certain forms of leadership styles and behaviours (Feijó et al., 2019). In line with these findings and drawing on Karasek's JD-C model (1979), other studies have found high job demands, low job control, and their

combination (i.e., job strain) to be associated with an increased risk of workplace bullying (Baillien, De Cuyper, et al., 2011; Baillien, Rodríguez-Muñoz, et al., 2011; Janssens et al., 2016; Takaki et al., 2010).

By contrast, the review by Feijó et al. (2019) pointed at greater inconsistencies regarding findings related to individual characteristics. In most included studies, women were more likely than men to report exposure to workplace bullying, yet results were not consistent. Inconsistent findings were further reported regarding age, family composition, and education as risk factors for exposure. It has been proposed that non-prototypicality (i.e. not belonging to the majority group within the workplace), rather than certain demographic characteristics, may better explain why some individuals face a higher risk of becoming exposed to workplace bullying (Glambek et al., 2020; Ramsay et al., 2011). Supporting this, studies have reported a higher risk of bullying to occur among underrepresented groups, such as foreign-born employees (Rosander & Blomberg, 2021) and at workplaces with an unequal gender-distribution (Ortega et al., 2009; Rosander, Hetland, et al., 2022).

Another strand of research has focused on the role of personality traits and found that neuroticism (a dispositional tendency to experience negative affect, see Widiger & Oltmanns, 2017) has been associated with an increased risk of exposure to workplace bullying, though largely relying on cross-sectional evidence (Nielsen, Glasø, et al., 2017). However, other research has found that accumulated exposure to workplace bullying might affect psychological traits over time, further complicating causal interpretations (Farley et al., 2025; Hamre et al., 2020; Persson et al., 2016).

Furthermore, a few studies have found that stressful experiences in childhood, including exposure to school bullying, may increase the likelihood of being exposed to bullying at work (Hoprekstad et al., 2021; Kizuki et al., 2020). In addition to the factors discussed above, an increased vulnerability of exposure to workplace bullying has been reported for workers with a history of poor mental or physical health (Blomberg & Rosander, 2021; Einarsen & Nielsen, 2015), which will be further elaborated on in later sections of this thesis.

Workplace bullying in the Swedish and Danish policy context

Available evidence indicates that workplace bullying occurs less frequently in the Scandinavian countries (Sweden, Denmark, and Norway), compared to other countries (Nielsen et al., 2010). Nonetheless, workplace bullying re-

mains a significant concern also here, affecting a substantial number of workers in each year³ (Danish Working Environment Authority, 2019; Swedish Work Environment Authority, 2022b). As such, workplace bullying continues to be a central psychosocial work environment issue in both Sweden and Denmark (Danish Working Environment Authority, n.d.; Swedish Government Official Report, 2025; Swedish Ministry of Employment, 2021).

A defining feature of work in the Nordic countries is the strong cooperation between employers, employees, and unions (Gustavsen, 2011). The Nordic countries further have a long-standing tradition of occupational health and safety initiatives at the legislative level, and were early to recognize the importance of the psychosocial work environment for worker's health and well-being (Smith, 2016). At the same time, in both Sweden and Denmark, similar to other Nordic countries, mental health conditions constitute a major occupational health challenge, as demonstrated by increasing rates of sickness absence related to mental health conditions (Blomgren & Perhoniemi, 2022; Swedish Social Insurance Agency, 2020b).

In 1993, Sweden became the first country in the world to enact legislation addressing workplace bullying, framing it under the term victimization (Swedish: *kränkande särbehandling*). Employers were mandated to prevent and counteract abusive behaviours directed at one or more individuals that could lead to ill-health or social exclusion within the workplace. Since then, employer responsibilities have been further clarified through regulations on systematic work environment management (AFS 2001:1, AFS 2023:1, AFS 2023:2) and the provisions on organizational and social work environment (AFS 2015:4). In Denmark, workplace bullying is addressed in the Working Environment Act and related provisions issued by the Danish Working Environment Authority, with a clear emphasis on the employer's responsibility to prevent psychosocial risks. Here, bullying is explicitly defined, closely aligning with definitions commonly applied in research. Legally, both Sweden and Denmark limit victimization/bullying to interactions between individuals within the workplace (employees and/or supervisors), whereas acts stemming from external sources are treated under different regulatory frameworks.

Beyond national legislation, both Sweden and Denmark have adopted international frameworks such as the European Framework Agreement on Harassment and Violence at Work (European Social Partners, 2007), which set out obligations for preventing harassment and violence in the workplace. Furthermore, the International Labour Organization's convention on eliminating violence and harassment in the world of work (International Labour Organization, 2019) was ratified by Denmark in 2024. The convention has not

³ A rough calculation: In Sweden, with a working population of approximately 5.23 million, the reported 7–9% prevalence corresponds to approximately 366,000–471,000 workers annually. In Denmark, with a working population of approximately 3.1 million, the 9–12% prevalence corresponds to approximately 279,000–372,000 workers per year.

yet been ratified in Sweden, however, according to the Swedish Government Official Report (2021), no legislative changes would be required for this.

Mechanisms linking exposure to workplace bullying to mental health conditions

Several theoretical perspectives can help explain the link between exposure to workplace bullying and subsequent development of mental health conditions. These will be presented below. While this thesis has not aimed to formally test specific theories, these theories have informed the research objectives and guided the interpretation of the results.

As discussed already, one suggested mechanism by which the psychosocial work environment may alter health is via stress responses and psychophysiological changes (Rugulies, 2019). In line with this, cross-sectional studies have linked exposure to workplace bullying to reduced saliva cortisol levels (a marker of physiological stress reactions), potentially suggesting altered HPA-axis activity following exposure (Hansen et al., 2006; Hansen et al., 2011; Hogh et al., 2012). However, these findings were not confirmed in a prospective study, examining changes in exposure status (i.e. onset/discontinuation of bullying exposure) (Gullander et al., 2015).

Exposure to workplace bullying has been proposed as a particularly harmful social stressor (Gerhardt et al., 2021; Hauge et al., 2010), which may be explained by returning to some of its characteristics. First of all, workplace bullying involves social acts that are commonly perceived as unexpected and in violation of social norms (Ramsay et al., 2011) and in some instances, acts that directly threaten one's safety (Einarsen et al., 2011). Secondly, besides each act of mistreatment operating as an episodic stressor, exposure to workplace bullying likely constitutes a chronic stressor, via the sustained pattern of such acts over time. Moreover, being exposed to bullying at work, which according to many definitions involves power imbalance or inability to defend oneself, not only requires sustained effort but has also been suggested to deplete resources over time (Farley et al., 2023). A few studies have supported this notion, although mostly cross-sectional (see Rai & Agarwal, 2018). Using a prospective design, Tuckey and Neall (2014) demonstrated that workplace bullying was associated with subsequent lower social and personal resources (coworker support, self-efficacy, and optimism). Moreover, a qualitative study found that as bullying escalated, individuals increasingly relied on less adaptive coping strategies (Karatuna, 2015). In the same study, the authors concluded that the efficacy of coping strategies was largely dependent on having a supportive social environment. While more studies are needed in order to draw firm conclusions, these results tentatively suggest that exposure to workplace bullying may generate stress not only directly but also indirectly,

by diminishing resources, which will likely influence future appraisals. Consequently, exposed individuals may experience increased stress as feelings of hopelessness, helplessness, and loss of control grow. This could further serve to increase the risk of using maladaptive coping strategies to tackle the situation, including changes in health-related behaviours such as increased alcohol use or sleep disturbances, which have both been prospectively predicted by exposure to workplace bullying (Nielsen et al., 2020; Rospenda et al., 2023).

While the depletion of resources over time may influence future stress appraisals, several theories (including the previously presented JD-R model) also highlight the buffering role that resources can have on the development of poor health (Bakker & Demerouti, 2014; Hobfoll, 1989). This would suggest that exposure to workplace bullying, just like other working conditions, does not operate in a vacuum, but rather acts in a complex system, involving interplay with many other factors, both internal and external to the individual (Rod et al., 2024). An important factor among these is social support which is often hypothesized to buffer the impact of stressors, both by influencing the appraisal process, and by increasing the likelihood of efficient coping (Cohen & Wills, 1985). This has been suggested also in the case of workplace bullying, as studies found co-worker support and friendships at work to decrease its negative impact on well-being (Farley et al., 2023).

Moreover, similar to how school bullying has been conceptualized (Östberg et al., 2018), workplace bullying can be understood as a form of social-evaluative threat, since it involves acts that may undermine an individual's social value (Gerhardt et al., 2021; Shorey & Wong, 2021). Establishing and maintaining social relationships has long been considered the fuel for human motivation (Baumeister & Leary, 1995), with group inclusion considered deeply tied to survival. In the context of work, the Stress as Offense to Self-framework (Semmer et al., 2007) argues that stress arises when individuals perceive threats to their self-esteem, including when the feeling of being valued by others is threatened. Relational devaluations, signalled by the lack of fair treatment or respect, are considered especially harmful when they occur repeatedly, as in workplace bullying (Semmer, 2020). Supporting this view, psychiatric research has found both threats to self-esteem and experiences of humiliation as risk factors for depression, while the evidence as risk factors for anxiety is less clear (Brown & Harris, 1978; Kendler et al., 2003; Sowislo & Orth, 2013). Moreover, negative evaluation by others has been found to elicit physiological stress responses (Dickerson & Kemeny, 2004) and affect the way individuals view and feel about themselves, including decreasing self-esteem (Baumeister & Leary, 1995). This is echoed in qualitative studies on workplace bullying, where exposed individuals report feelings of shame and anger (Ayoko et al., 2003; Lewis, 2004). Quantitative studies have further demonstrated that negative emotions, including feeling upset and ashamed, partly mediate the association between workplace bullying and both physical

health and occupational outcomes (Glaso & Notelaers, 2012; Glaso et al., 2011; Vie et al., 2012).

Empirical evidence on exposure to workplace bullying as a risk factor for mental health conditions

Building on the mechanisms outlined above, it seems theoretically plausible that exposure to workplace bullying may increase the risk of mental ill-health of targets. This idea was already present in seminal works on workplace bullying. Leymann (1996) proposed that prolonged exposure to systematic negative acts at work could result in severe psychological damage and, in some cases, clinical mental health conditions. Since then, with a few exceptions, a growing body of empirical research has supported such associations, with meta-analyses and large-scale studies consistently showing that exposure to workplace bullying is associated with mental health conditions, including depressive and anxiety symptoms (Nielsen & Einarsen, 2012; Nielsen et al., 2015; Verkuil et al., 2015) and depressive disorders (Mikkelsen et al., 2021), as well as related outcomes such as sickness absence (both all-cause and mental health-related) (Liao et al., 2023) and suicidal behaviour (Conway et al., 2022; Magnusson Hanson et al., 2023). Generally, these studies report effect sizes of small to moderate magnitude (Nielsen & Einarsen, 2012; Verkuil et al., 2015).

Notably, Mikkelsen et al. (2021) found workplace bullying to be the strongest predictor of depressive disorders among psychosocial working conditions, with a pooled odds ratio (OR) of 2.58 (95% CI: 1.13–5.93), compared to ORs of 0.9–1.6 for other examined conditions. Although based on only four prospective studies (Bonde et al., 2016; Gullander et al., 2014; Kivimaki, 2003; Rugulies et al., 2012), this finding implies that bullying may be linked not only to self-reported mental health symptoms but also to clinical mental disorders. However, in two of the included studies, the population was restricted, either to hospital-employees (Kivimaki, 2003) or to female workers within the eldercare sector (Rugulies et al., 2012), which might restrict the generalizability of the findings to the wider working population. Nevertheless, the results were corroborated in a recent Danish study, using data from nine predominantly population-based samples of the Danish working population. In addition to finding that workplace bullying was associated with the purchase of psychotropic drugs, workplace bullying was linked to an increased risk of subsequent hospital-diagnosed depressive and anxiety disorders (Conway et al., 2025), albeit with lower effect estimates than reported by Mikkelsen et al. (2021) (HR for mood disorders: 1.36, 95% CI: 1.12-1.66; HR for neurotic, stress-related and somatoform disorders: 1.33, 95% CI: 1.10-1.62).

So far, research on mental health outcomes of workplace bullying has focused predominantly on depression, while anxiety-related outcomes have received comparatively less attention (Rugulies et al., 2023; Verkuil et al., 2015). Verkuil et al. (2015) reported that associations with depressive symptoms tended to be stronger than those with anxiety or stress-related symptoms, which could imply that bullying has a more pronounced impact on certain types of mental health conditions. It has been suggested that exposure to an adverse work environment may differentially elicit high- and low-arousal strain, with anxiety/irritation (high-arousal strain) developing more rapidly than depression/fatigue (low-arousal strain) (Ford et al., 2014). However, when tested empirically, this pattern was not confirmed (Ford et al., 2014).

Variation by exposure operationalization

While the direction of association between workplace bullying and mental health outcomes is generally consistent, the magnitude may vary depending on how workplace bullying is operationalized, including differences in measurement approach and modelling of exposure intensity. An early meta-analysis (Nielsen & Einarsen, 2012) found that studies assessing bullying exposure via the behavioural measurement approach yielded stronger associations with outcomes compared to studies relying on the self-labelling approach. Importantly, this analysis was not restricted to mental health outcomes but also included occupational-related outcomes such as job satisfaction and intention to leave, which might have affected the results. The latter meta-analysis by Verkuil et al. (2015), which focused solely on mental health outcomes of workplace bullying, did not find evidence for the exposure assessment method impacting the results. In contrast, in the meta-analysis by Mikkelsen et al. (2021), the authors reported that while all studies using the self-labelling approach found that bullying was associated with later depressive disorders, studies assessing bullying via aggregated work-unit exposure or examined exposure to specific negative acts reported non-significant effects. Although not formally tested, this pattern could suggest that the associations between workplace bullying and depressive disorders to some extent depend on the measurement approach.

Regarding exposure intensity, empirical findings indicate a dose-response relationship. Studies using continuous measures of bullying exposure have shown that greater exposure is associated with a higher level of mental distress (Lo Presti et al., 2019; Steele et al., 2020), although the exact shape of this relationship is rarely tested. Similarly, studies using categorical comparisons indicate that individuals who are frequently bullied are at higher risk of developing mental health conditions than those bullied occasionally (Lange et al., 2020; Rugulies et al., 2012).

Variation by study design and exposure duration

In terms of temporal design, effect sizes are generally larger in cross-sectional studies than in prospective studies (Verkuil et al., 2015). Nevertheless, prospective associations with mental health conditions have been demonstrated in studies with short-, medium-, and long-term follow-ups, ranging from one month to five years (Boudrias et al., 2021; Einarsen & Nielsen, 2015; Rodriguez-Munoz et al., 2020). These results suggest that workplace bullying may influence mental health both immediately and over time. Although temporal dynamics can be more easily assessed in prospective studies than in cross-sectional designs, interpreting these associations remains challenging, as bullying is often measured at only one point in time. It is therefore unclear to what extent observed associations reflect the outcomes of prior exposure, continued exposure at follow-up (effectively being a cross-sectional association), or a combination of both. A German study reported that the association between bullying and depressive symptoms was stronger among individuals who did not change jobs compared to analyses including those who did (Lange et al., 2020). Assuming that exposure would end following job change, this suggests that prolonged exposure may contribute to the observed associations. Extending these findings, a Swedish study examining individuals who had changed jobs found that associations with depressive symptoms persisted even after leaving the job where bullying occurred, whereas anxiety symptoms no longer showed significant associations (Rosander, Salin, et al., 2022). At the same time, these individuals remained at elevated risk of bullying behaviours, albeit at lower frequency compared to those who stayed, thus suggesting that they could still experience exposure that may continue to affect outcomes (Rosander, Salin, et al., 2022).

Variation by sex

The magnitude of associations between workplace bullying and mental health conditions might further vary for men and women, although findings remain mixed. The meta-analysis by Verkuil et al. (2015) found robust associations between workplace bullying and both concurrent and subsequent symptoms of depression, anxiety, or stress-related disorders for both men and women. In contrast, in the study by Conway et al. (2025), which was based on pooled data from 75 252 Danish workers, sex-stratified analyses showed an association between workplace bullying and onset of mental disorders only in women, not in men. Yet, other studies have suggested that men, rather than women, face a higher risk of psychological distress after bullying exposure (Einarsen & Nielsen, 2015). Furthermore, one study found that associations between workplace bullying and mental health outcomes were similar for men and women when using the behavioural measurement approach, but differed when bullying was assessed via self-labelling (with significant associations

observed only in men) (Rosander et al., 2020), indicating that the choice of measurement method may partly explain inconsistencies in reported sex differences.

Influence of other psychosocial work factors

Beyond study design and individual characteristics, the broader psychosocial work environment may also influence mental health outcomes of workplace bullying. As discussed in the section on risk factors for workplace bullying, workplace bullying might be preceded by both unfavourable workplace structures and poor psychosocial working conditions (Feijó et al., 2019). Such conditions might however also play a role after bullying has occurred, affecting individual stress responses and coping resources, and potentially modifying the influence of bullying on mental health. Supporting this, a recent systematic review concluded that both social and organizational resources at work may protect against low well-being (including psychological, physical, and organizational outcomes) following exposure to workplace bullying (Farley et al., 2023). When focusing specifically on psychological outcomes, social factors, such as co-worker support and friendships at work, appeared to play a particularly important role. While primarily based on results from cross-sectional studies, this suggests that interpersonal relationships at work may be especially relevant for mitigating the mental health consequences of bullying. In contrast, the role of leaders in this process remains less clear, with studies reporting mixed findings regarding potential buffering effects of leadership support and leadership styles (Farley et al., 2023).

Bidirectional associations with mental health conditions

Meta-analytical evidence has demonstrated bidirectional relationships between workplace bullying and mental health conditions (Nielsen & Einarsen, 2012; Verkuil et al., 2015). In other words, not only does workplace bullying exposure predict later mental health conditions but pre-existing mental health conditions also appear in themselves a risk factor for being exposed to bullying. This indicates a potential reciprocal relationship between bullying and mental health, where each increases the risk of the other, or even a vicious circle in which the two reinforce one another over time. Several explanations for this reverse path have been suggested, which are not necessarily mutually exclusive. Unhealthy workers may be more likely to end up in workplaces with unfavourable working conditions (reverse causation/selection effect); mental health conditions may increase the likelihood of perceiving social interactions negatively (“gloomy perception mechanism”); or mental health conditions may elicit aggressive responses from others, such as when individuals struggle to perform optimally (Conway et al., 2021; de Lange et al., 2005).

Bidirectional associations of this sort pose methodological challenges when trying to disentangle cause and effect, since reverse causation might lead to an overestimation of the examined associations (Leszczensky & Wolbring, 2019). Cross-sectional designs are particularly vulnerable to reverse causation. In these studies, the directionality of associations remains empirically untested, making it difficult or even impossible to disentangle if exposure to bullying precedes mental health or vice versa. Still, even prospective studies may be affected by reverse causation if prior mental health is not adequately accounted for. For instance, the previously mentioned study by Conway et al. (2025), only included individuals without any history of mental disorders or psychotropic drug purchases. However, the analyses did not adjust for baseline depressive symptom levels, which may also be important. Mental disorders are typically preceded by subclinical symptoms (Banack et al., 2019; Lee et al., 2019). Individuals with pre-existing undiagnosed mental disorders or experiencing subclinical symptoms of mental disorders (mental distress) may thus be more vulnerable to exposure to workplace bullying while simultaneously being at higher risk of subsequent mental health problems. This implies that prospective associations could still be confounded by baseline mental health conditions. Supporting this concern, Lange et al. (2020) showed that both occasional and severe (i.e., at least weekly) bullying were associated with clinical levels of depressive symptoms five years later in a German working population. However, when additionally adjusting for baseline subclinical depressive symptoms, the association remained statistically significant only for severe bullying (OR 1.71, 95% CI 1.04–2.82).

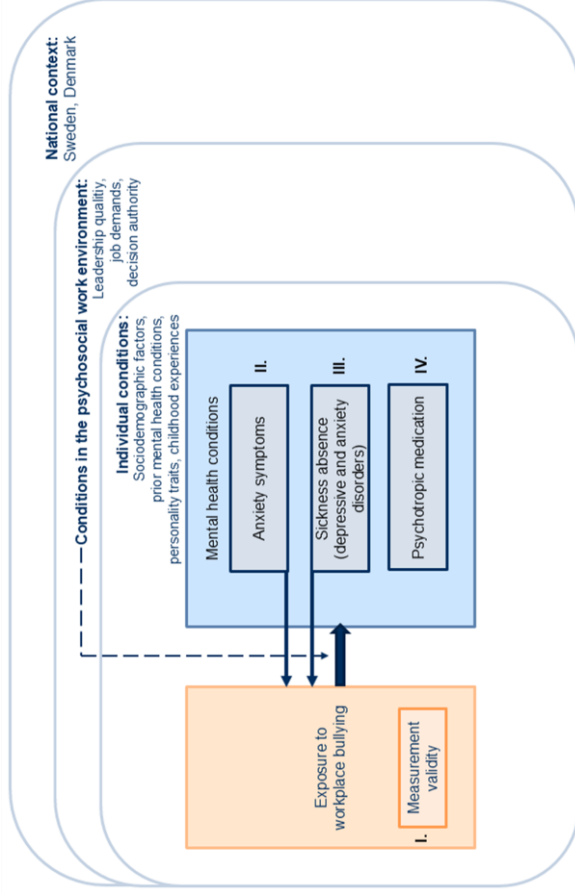
Thesis contribution

According to the review of the literature, the link between workplace bullying and mental health conditions is well-documented. However, several methodological challenges have so far hindered firm conclusions regarding causality. Among others, this includes the limited number of prospective or multi-wave studies, insufficient adjustment for pre-existing mental health conditions and other respondent characteristics, and limited consideration of additional psychosocial working conditions (Mikkelsen et al., 2021). In addition, much existing research relies on self-reported mental health outcomes, which, when combined with self-reported exposure data, might increase the risk of common method bias (Podsakoff et al., 2024). Prospective studies that use register-based indicators to capture mild-to-moderate mental health conditions remain scarce, and multi-wave studies that examine temporal sequences and bidirectional associations are lacking. Moreover, the generalizability of existing findings to the general working population may be limited due to selective study populations. Thus, it remains to elucidate whether bullying can, in fact, cause mental health conditions, as well as under what conditions this occurs.

To address these knowledge gaps, this thesis examines workplace bullying as an exposure in the psychosocial work environment by (i) examining the validity of the bullying measure used in this thesis, (ii) analysing its temporal associations with both self-reported and register-based indicators of depression and anxiety, and (iii) considering the role of other psychosocial working conditions in shaping these associations. By relying on large national samples, originally representative of the Swedish and Danish working population, coupled with advanced methodological approaches to address confounding from individual conditions, the thesis further aims to contribute to the issue of causality between workplace bullying and the development of mental health conditions. A graphical illustration of the four empirical papers included in this thesis is presented in Figure 3.

From a public health perspective, greater awareness of mental health conditions following workplace bullying can underscore the importance of continued preventive measures, thereby reducing the individual and societal burden of such experiences. The question of causality is also important from a legal standpoint. Ensuring safe working conditions is a statutory obligation of employers in the Nordic countries and many others. If an employee's health is negatively affected by their work, they may be entitled to compensatory claims. Last but not least, knowledge regarding the buffering potential of other psychosocial working conditions can further increase our understanding of how workplaces can be structured to protect employee health and may inform organizational practices aimed at shaping health-promoting work environments.

Figure 3. Graphical illustration of the four papers (I–IV) included in this thesis, examining exposure to workplace bullying and its association with mental health conditions in the national contexts of Sweden and Denmark, while considering the potential influence of individual conditions as well as conditions in the psychosocial work environment.



Note. Roman numerals refer to the respective paper included in this thesis. The figure displays examples of individual and psychosocial work environment conditions that may influence the overall association between workplace bullying and mental health conditions. Note that each paper is designed to consider a specific set of individual and work environment conditions, relevant to the particular associations that are examined.

Materials and methods

This chapter presents the methodology used in the empirical papers of this thesis. This includes an outline of data sources, study populations, and main variables, as well as a brief explanation of the study designs and statistical methods that have been used. Study-specific details can be found in the respective papers. The chapter ends with a reflection on the ethical aspects of this thesis project.

Data sources

Survey data

Swedish Longitudinal Occupational Survey of Health

This thesis uses data from the Swedish Longitudinal Occupational Survey of Health (SLOSH). SLOSH is a prospective cohort study focusing on associations between labour market participation, work environment, retirement, and health (Magnusson Hanson et al., 2018). It was initiated in 2006 by the former Institute for Psychosocial Medicine (later the Stress Research Institute, Department of Psychology, Stockholm University) to enable longitudinal epidemiological research on a representative sample from the Swedish working-age population.

Participants in SLOSH have been followed biennially (since 2022 annually) via self-report questionnaires that generally come in two versions – one directed towards individuals in work (defined as working 30% or more of full-time during the past 3 months) and one towards individuals who have permanently or temporarily exited the labour market (defined as not working or working less than 30% of full time during the past 3 months). From 2006 to 2020, SLOSH was distributed as a paper questionnaire, and participants chose the correct version to fill out by themselves. Respondents could thus move between different versions over the years. Since 2022, the survey is mainly distributed as a web survey, and depending on reported work status, respondents receive a certain set of questions.

The SLOSH survey includes questions about health, health-related behaviours, and social situation as well as questions about the current work situation

and work environment, or the situation outside the labour market, dependent upon questionnaire version/work status. A mix of single items and validated scales are included in the questionnaires. Some parts and items of the questionnaires have remained unchanged over time, while others have been removed, changed, or added, and not all items and scales are distributed every wave. Occasionally, subsamples of the cohort are invited to take part in additional surveys, distributed outside the regular (biennial/annual) questionnaires. This was the case in 2020 (“SLOSH corona”) and 2023 (“SLOSH offensive acts”), among others.

The initial SLOSH cohort (invited to take part in the questionnaire in 2006) was designed as a follow-up of the Swedish Work Environment Survey (SWES) 2003. SWES is a cross-sectional survey of the work environment among gainfully employed individuals, 16 to 74 years of age (until 2015 the upper age limit was 64 years), administered by Statistics Sweden on behalf of the Swedish Work Environment Authority. It is carried out every second year and consists of both a telephone interview and a self-completing survey. Until 2024, this was carried out in conjunction with the Swedish Labour Force Survey (LFS), targeting a subset of respondents who report being gainfully employed (Statistics Sweden, 2023; Swedish Work Environment Authority, 2022b). Participants in LFS are in turn sampled from the Swedish Total Population Register (restricted to ages 15 to 74), stratified by county, sex, and citizenship. Since its start, the SLOSH cohort has expanded with additional sampling from respondents to SWES 2005-2019, and, in 2024, the cohort comprised 57 104 individuals. Data collection is ongoing, with 12 completed waves so far.

The studies in this thesis are based on selected SLOSH questionnaires collected between 2008 and 2024. Additionally, data from the additional SLOSH offensive acts survey is used. The SLOSH offensive acts survey was distributed in June 2023 to a subset of respondents of SLOSH 2023 who reported being in work and had consented to be invited to additional questionnaires (N invited=3201, N respondents=1326). As indicated by the name, SLOSH offensive acts focused on a set of questions on different forms of mistreatment at work, such as bullying, sexual harassment, and violence/ threats of violence.

The Work Environment and Health in Denmark Study

In studies II and IV, SLOSH data is complemented with data from the Work Environment and Health in Denmark Study (WEHD). WEHD was carried out biennially during the period 2012 to 2018 by the Danish National Research Centre for the Working Environment, and intended to monitor and investigate associations between work, work environment, and health in the Danish workforce (Sørensen et al., 2025). WEHD contains items and scales covering health, health-related behaviours, social factors, current work situation, and working conditions (Sørensen et al., 2025).

Unlike SLOSH, WEHD consists of both cross-sectional samples (four in total, one per data collection year) and cohort samples. The cross-sectional samples were randomly sampled from all employed individuals aged 18 to 64, living and paying taxes in Denmark, who had worked for 35 hours or more in total during December and January preceding survey distribution, and holding a minimum monthly salary of 3000 Danish Krona (approximately 400 euros). In 2012 and 2016, these population-based samples were supplemented with a workplace-stratified sample, these were however not considered in this thesis.

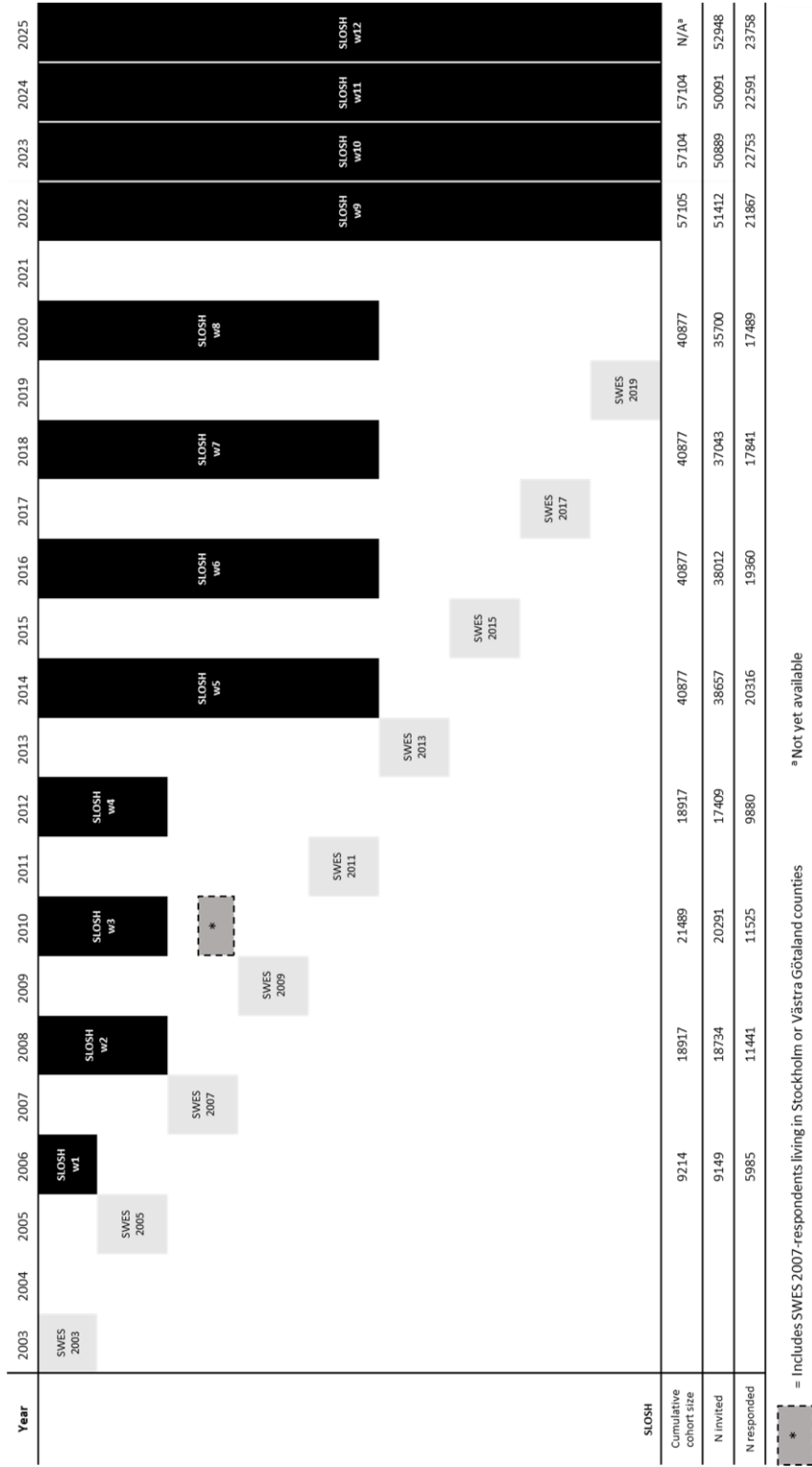
Based on the cross-sectional samples, two longitudinal cohorts have been set up. The first cohort consists of respondents to WEHD 2012 who have been re-invited to participate in WEHD in 2014, 2016, and 2018 (N=5933). The second cohort consists of first-time respondents to the cross-sectional WEHD in either 2012 or 2016, who were invited for follow-up in 2014 and 2018 respectively (N=22 445). Data from both of these cohorts are used in this thesis.

Response rates and attrition in SLOSH and WEHD

Due to the complex design of the SLOSH cohort, inviting new participants from SWES at multiple time points, it is not straightforward to assess non-response and attrition rates. Among eligible SLOSH cohort members (i.e. invited participants), response rates have gradually decreased from 65.4% in the initial survey to 45.1% in 2024. A small dip was noted in 2022 (response rate 42.5%), when the main format changed from pen and paper to an online survey. Notably, an invitation to SLOSH is also contingent upon having participated in SWES, which, during the years 2003-2013, only about 55% of all targeted LFS respondents did (Swedish Work Environment Authority, 2014). The exact share of working individuals who opted not to respond to the LFS, however, remains unknown. Figure 4 displays the cumulative cohort size and number of respondents to each of the twelve completed SLOSH waves.

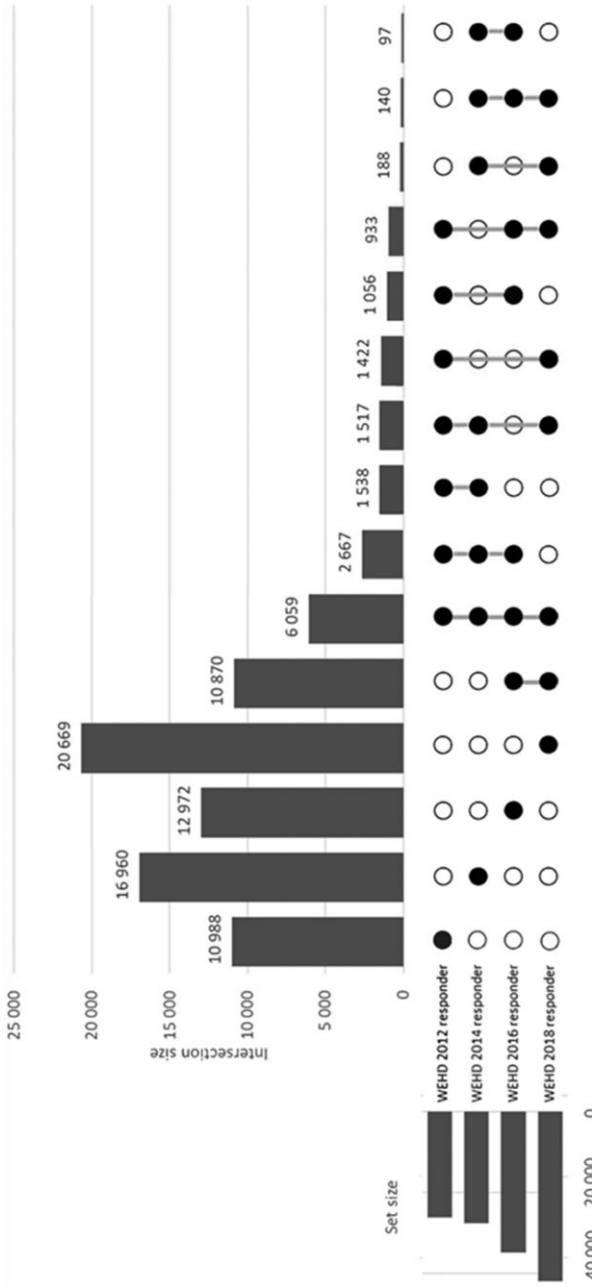
Among the total cohort in 2024 (N=57 104), 13.8% had completed the SLOSH survey once, 11.2% had completed two surveys, and 14.6% three surveys, although not necessarily in consecutive waves. A comparison of the respondents to SLOSH 2006 and SWES 2003 shows that women, individuals born in Sweden, and individuals holding a university education were more likely to participate in SLOSH (Magnusson Hanson et al., 2018). Additionally, they were more likely to be older and married. These differences seem to become more pronounced when comparing respondents in SLOSH 2006 who have taken part in up to five subsequent surveys, to those who only took part in the initial survey. Moreover, the proportion of individuals reporting sub-optimal health and depressive symptoms is lower among those with repeated participation (Magnusson Hanson et al., 2018). In sum, while SLOSH was based on an approximately representative sample at its inception, these patterns suggest that representativeness has gradually decreased over time.

Figure 4. Cohort size and number of respondents to the twelve completed waves (w) of SLOSH.



Response rates to the cross-sectional WEHD surveys (excluding the workplace stratified samples) have ranged from 47.5% to 56.3% over the years (Sørensen et al., 2025). Figure 5 shows the number of participants responding to each possible combination of the four WEHD survey waves (2012, 2014, 2016, and 2018). Among all invited participants, women, older individuals, and those with higher education are more likely to respond. Attrition rates for the four- and two-wave longitudinal cohorts are 62.6% and 25.3% respectively. Analyses have shown that individuals who are older, have higher educational attainment, and report better health are more likely to participate in multiple survey waves (Sørensen et al., 2025). Unlike SLOSH, which involves stepwise selection via LFS and SWES, WEHD participants are sampled directly from the source population (i.e. total working population), thus making it likely more representative than SLOSH, however still not fully representative of the working population.

Figure 5. Number of respondents to different combinations of the four WEHD survey waves.



Cohort I: First-time responders to any WEHD wave, N=88,076. **Cohort II:** Eligible responders from WEHD 2012 (N=15,852) who were invited to the following waves with 14,085, 10,961, and 5,933 who responded in at least two, at least three, or all four waves (2012, 2014, 2016, and 2018). **Cohort III:** Responders from then WEHD 2012 or WEHD 2016 how were eligible and responded in the follow-up in WEHD 2014 (N=11,781) or WEHD 2018 (10,674), yielding a total of N=22,455.

Note. Reproduced from Sørensen et al. (2025) under the Creative Commons Attribution–NonCommercial License.

Register data

Via personal identification numbers, it is possible to link registry data from several national registers to the SLOSH and WEHD participants. For the papers in this thesis, we used registry data covering sickness absence benefits (Paper III), redeemed psychotropic medication (Paper IV), and sociodemographic information (Papers I-IV), as well as information on date of death (Papers III-IV) from the following databases and registries:

Microdata for the analysis of social insurance register (MiDAS)

MiDAS is a database containing information regarding sickness absence and disability pension benefits, administered by the Swedish Social Insurance Agency. Information is available from 1994 and includes (among others) start and end dates of sickness absence or disability pension benefit spells, whether benefits are taken full-time or part-time, as well as the cause of sickness absence, in terms of the associated medical diagnosis (coded according to the concurrent version of ICD) (Swedish Social Insurance Agency, 2011). Medical diagnosis is available from 2002 only. In Sweden, sickness absence benefits are usually provided from day 15, with the first two weeks (minus an initial qualifying day) covered by the employer.

Swedish National Prescribed Drug Register

Prescription drugs (i.e. drugs that are prescribed by a healthcare provider) are dispensed at pharmacies only in Sweden. The Swedish National Prescribed Drug Register contains information, starting from 2005, on all prescribed medications that have been dispensed at pharmacies in Sweden. This includes type of product (classified according to the Anatomic Therapeutic Chemical classification system [ATC]), date of purchase, and associated costs. It is managed by the National Board of Health and Welfare, who in turn receive data from the Swedish eHealth Agency. Swedish law mandates all Swedish pharmacies to report the selling of pharmaceuticals to the eHealth Agency. Drugs used in hospital admissions are not included in the register, and there is only partial coverage of drugs used in ambulatory care and nursing homes. (Wettermark et al., 2007).

Danish National Prescription Register

The Danish National Prescription Register, managed by Statistics Denmark and the Danish Health Data Authority, contains information, starting from 1995, on all prescribed medications dispensed at pharmacies and nursing homes in Denmark, including type of product (classified according to ATC) and date of purchase. Drugs used in hospital settings are not included in the register, nor are pharmaceuticals used by individuals who are institutionalized (i.e. due to psychiatric illnesses). (Pottegård et al., 2016).

Longitudinal integrated database for health insurance and labour market studies (LISA)

Administered by Statistics Sweden and updated annually since 1990, LISA contains annual information (sourced from national registers and authorities) on a range of sociodemographic variables such as educational attainment, socioeconomic position, family composition, income sources, and employment status for the adult Swedish population (since 2010 defined as aged 15 or older) (Ludvigsson et al., 2019). Where relevant, LISA further includes information on the month and year of emigration from Sweden.

Danish Civil Registration System (CRS) and Danish Population's Education Register

The CRS, established in 1968, contains regularly updated data on variables such as place of residence, marital status, and sex for all individuals living in Denmark, as well as information regarding immigration and emigration, when applicable (Pedersen, 2011). The Population's Education Register, administered by Statistics Denmark, contains individual-level data on highest educational attainment and has been maintained since 1981 (Thygesen et al., 2011).

Swedish Cause of Death Register

The Swedish Cause of Death register is held by the National Board of Health and Welfare and has been updated annually in electronic form since 1961. It contains information on the date and causes of death among Swedish residents, the latter through associated ICD-codes (Brooke et al., 2017).

The Danish Register of Causes of Death

Maintained by the Danish National Board of Health, the Danish Register of Causes of Death contains information regarding date and causes of death for Danish citizens. It has existed in its current electronic form since 1970 (Helweg-Larsen, 2011).

Study populations

In all four papers, the study populations consist of working adults (aged 18 and older at baseline) residing in Sweden (Papers I and III) or Sweden and Denmark (Papers II and IV). However, the source populations differ between papers due to different study aims and due to variations in item availability and the accessibility of registry data for the follow-up period of interest. In Paper I, two different source populations from SLOSH were used, providing qualitative and quantitative data respectively. In Papers III and IV, our source populations were created by pooling data from several baseline survey years.

In cases where individuals had participated several times, they were only included in the year of their first participation (thus every observation represents a unique study respondent). Specific inclusion- and exclusion criteria have been applied in all studies, in alignment with the study-specific aims. Table 2 presents the aim of each empirical paper of this thesis, together with information on the source population, applied inclusion- and exclusion criteria, as well as size and baseline sociodemographic details of the main analytical sample. In Papers I and III, two analytical samples were used. The additional samples, which are not included in Table 2, are presented in their respective manuscripts.

Table 2. Overview of aims, study populations, and sample characteristics by paper.

Paper	Aim	Source population (baseline year)	Inclusion criteria	N	% women	Mean age (SD)	% education ^a
I	Examine the theoretical and psychometric properties of a single-item measure of workplace bullying	SLOSH ^b (2023 ^{c,d}) N=8517	Agreed to participate in extra data collection Provided correct email address Participated in SLOSH offensive acts Worked >50% at the time of SLOSH offensive acts	1 148	55.5	53.4 (8.9)	30.4/15.6/54.0
II	Examine temporality and directionality between workplace bullying and symptoms of anxiety. Assess if leadership quality buffers these associations	SLOSH (2016), WEHD (2012) N=39 365	No missing data on workplace bullying measures Participation in three consecutive surveys Not self-employed No missing data on leadership quality at baseline	13 491	57.3	48.5 (9.4)	47.9/21.9/30.2
III	Examine bidirectional associations between exposure to workplace bullying and sickness absence due to common mental disorders	SLOSH (2012/2014/2016) N=20 395	No missing information on covariates First eligible participation only	19 152 (3216 in matched sample)	56.3	49.9 (10.2)	49.2/18.5/32.4
IV	Examine the association between onset of workplace bullying and subsequent initiation of psychotropic treatment	SLOSH (2012/2014/2016), WEHD (2012/2016) N=105 829	Participation in two consecutive surveys Unexposed to workplace bullying at baseline No recent history of psychotropic medication ^e No missing information on covariates First eligible participation only	25 309	52.8	47.4 (10.1)	52.1/20.6/27.3

Note. ^a=low: primary or secondary education; medium: <3 years post-secondary education; high: ≥3 years post-secondary education. ^b=all SLOSH questionnaires refer to the in-work version. ^c=a subset consisting of those who had completed the web-based survey by May 2023. ^d=Note that this table refers to the sample used for the quantitative analysis. ^e=3 years before second survey

Variables

Indicators of mental health conditions

All four papers in this thesis include analyses of mental health conditions following exposure to workplace bullying. These have been operationalized in various ways, using both self-reported and registry-based indicators. This way, partly different aspects of mental health conditions are covered in each paper.

Depressive symptoms

In paper I, we used data on self-reported depressive symptoms to examine the predictive validity of a single-item measure of exposure to workplace bullying included in SLOSH. Depressive symptoms were assessed via The Symptom Checklist-core depression scale (SCL-CD6), included in SLOSH. The SCL-CD6 is a 6-item subscale from the Hopkins Symptom Checklist (SCL-90) (Bech, 2012; Lipman, 1986). Respondents are asked to indicate how much they have been bothered by depressive symptoms (no interest in things, feeling blue, feeling everything is an effort, low energy, self-blame, worry) during the last week, using five response options (0: not at all, 4: very much). A sum score was calculated for participants with no missing values on any items, and the cut-off of 17 points or more, identified in a previous study, was used to indicate clinical levels of depressive symptoms (yes/no), indicative of major depressive disorder (Magnusson Hanson et al., 2014).

Depressive symptoms (indicated by the sum score on SCL-CD6 in SLOSH and on the Major Depressive Inventory [MDI] (Bech et al., 2001) in WEHD) were also included as an adjustment covariate in Paper IV.

Anxiety symptoms

In Paper II, mental health conditions were operationalized as self-reported symptoms of anxiety, using data derived from SLOSH and WEHD respectively. In both surveys, anxiety symptoms were measured using the SCL-ANX4, a four-item subscale of the Symptom Checklist-25, which itself is a shortened version of the Symptom Checklist-90-Revised (SCL-90-R) (Søgaard & Bech, 2009). The SCL-ANX4 is also included in the Common Mental Disorders Questionnaire (CMDQ) (Christensen et al., 2005). In the CMDQ form of the scale, which was used in WEHD, respondents are asked to rate how much they have been bothered by specific symptoms (feeling scared, nervousness, panic, worry) over the past four weeks, using a 5-point scale (0: not at all, 4: very much). In SLOSH, the recall period was instead one week, in line with the original SCL-90-R format. Following recommendations, a sum score was calculated (for all participants with no missing values) and used as a continuous variable in all analyses (Søgaard & Bech, 2009).

The SCL-ANX4 has previously shown good psychometric properties, including strong correlations with diagnosed anxiety disorders according to the ICD-10 (codes F40-49, excluding somatoform disorders) (Christensen et al., 2005).

Anxiety symptoms were also included in Paper I. Here, a dichotomized variable (with ≥ 6 points representing clinical levels of anxiety symptoms) was created (Søgaard & Bech, 2009).

Sickness absence due to common mental disorders

In Paper III, we assessed mental health conditions through data on sickness absence spells (i.e. receiving sickness absence benefits), using information retrieved from the MiDAS register. Consequently, our measure only considered sickness absence spells lasting longer than 14 days. We only included sickness absence spells with a corresponding diagnosis of mood or affective disorders, anxiety disorders, or stress-related disorders (corresponding to ICD-10 codes F30-39 and F40-F48, see Table 3), referred throughout the paper as sickness absence due to common mental disorders (SA-CMD). We did not distinguish between full-time or part-time sickness absence.

The outcome variable was incident SA-CMD spell, using a follow-up period of two years. For adjustment purposes, we further created a variable that indicated presence of any SA-CMD spell before the start of follow-up (using data since 2002). Lastly, a binary variable was created that indicated any SA-CMD spell (yes/no) in between two survey time points. This was used in analyses of reverse associations.

Table 3. ICD-10 codes used to define sickness absence due to common mental disorders in Paper III.

ICD-10 code	Diagnosis
F30	Manic episode
F31	Bipolar affective disorder
F32	Depressive episode
F33	Recurrent depressive episode
F34	Persistent mood [affective] disorders
F38	Other mood [affective] disorders
F39	Unspecified mood [affective] disorder
F40	Phobic anxiety disorders
F41	Other anxiety disorders
F42	Obsessive-compulsive disorders
F43	Reaction to severe stress, and adjustment disorders
F44	Dissociative [conversion] disorders
F45	Somatoform disorders
F48	Other neurotic disorders

Redeemed psychotropic medication

In Paper IV, we operationalized mental health conditions through purchases of psychotropic medication, using data from Swedish and Danish prescription registers. The main outcome considered was incident purchase of any type of psychotropic medication during two years of follow-up, including anxiolytics, sedatives, or antidepressants (using ATC-codes N05B, N05C, and N06A). Additional analyses focused solely on purchases of antidepressant medication.

Exposure to workplace bullying

All four papers in this thesis examine self-reported exposure to workplace bullying. Table 4 presents how workplace bullying has been assessed in SLOSH and WEHD over the relevant years for this thesis.

Table 4. Overview of items measuring exposure to workplace bullying in SLOSH and WEHD.

Survey year	Item(s) and response options
SLOSH 2008	Are you subjected to personal persecution in the form of unkind words or behaviours from your superiors or fellow workers? <i>Every day/A couple of days a week (1 day of 2)/One day a week (1 day of 5)/A couple of days a month (1 day of 10)/ Sometimes during the last 3 months/Once or twice during the last 12 months/Not at all during the last 12 months</i>
2012 2014 2016 2018	During the last 6 months, have you been subjected to personal persecution in the form of unkind words or behaviours from your superiors or fellow workers? <i>Weekly/Monthly/Sometimes/No</i>
2020 2022 2023 2023 OA ^a	During the last 6 months, have you been subjected to personal persecution in the form of unkind words or behaviours from superiors? During the last 6 months, have you been subjected to personal persecution in the form of unkind words or behaviours from colleagues? During the last 6 months, have you been subjected to personal persecution in the form of unkind words of behaviours from others, e.g. customers, clients, patients or students? <i>Weekly/Monthly/Sometimes/No</i>
2023 OA ^b	“Bullying (e.g. harassment, social isolation or hurtful jokes) occurs when a person is repeatedly exposed to unpleasant, degrading or hurtful treatment at work, and the targeted individual has difficulties in defending himself or herself” Have you been exposed to bullying at work during the last 6 months? <i>Never/Sometimes/Every month/Every week/Daily</i> Negative Acts Questionnaire-Revised, 22 items. During the past 6 months, which of the following unwanted actions or negative situations are you/have you been exposed to at your workplace? Sample item: Having insulting or offensive remarks made about your person, attitudes, or private life <i>Never/Now and then/Monthly/Weekly/Daily</i>

	Survey year	Item(s) and response options
WEHD	2012 2014 2016 2018	<p>“Bullying occurs when one or more individuals regularly and over a longer period of time – or repeatedly in a rough way – subjects one or more individual to abusive acts, which are perceived as hurtful or degrading by the targeted individual(s)”</p> <p>Have you been exposed to bullying at work within the past 12 months?</p> <p><i>Yes, daily/Yes, weekly/Yes, monthly/Yes, seldomly/No, never</i></p> <p>If yes, who bullied you?</p> <p><i>Colleagues/Supervisors/Subordinates/Customers, clients, patients, students (multiple answers possible)</i></p>

Note. ^aOA=SLOSH offensive acts, distributed as an extra survey to a subsample of respondents to SLOSH 2023. ^bAdditional measures of exposure to workplace bullying, only included in SLOSH OA.

In SLOSH, workplace bullying is assessed through an item asking about exposure to “personal persecution in the form of unkind words and behaviours”, hereafter referred to as the “PP-item”. The question has been included since the initial SLOSH survey. It originally stems from SWES, where it was included for the first time in 1991, and has since then been considered a measure of workplace bullying by Statistics Sweden and the Swedish Work Environment Authority. In SLOSH, the time frame of the exposure period has changed over the years, with the latter waves referring to exposure to personal persecution during the past 6 months. Since 2020, the same core question has been asked in three versions, each specifying a different source of exposure. Here, the measure is extended to also include workplace bullying from external sources.

WEHD utilizes the self-labelling approach (with a definition) to measure workplace bullying. Here, respondents are provided with a formal definition of workplace bullying and are asked to indicate if they have been subjected to bullying at work, referring to an exposure period of 12 months. A second item asks about the source of exposure.

In the main analyses of this thesis, we treated exposure to workplace bullying as a binary variable (exposed/unexposed), with affirmative answers indicating exposure. Where applicable, only those who reported workplace bullying from within the organization (superiors and/or co-workers or subordinates) were considered to be exposed. This means that in cases where someone

only reported exposure to workplace bullying from external sources, that person was treated as unexposed⁴. In Papers I, III and IV, we additionally examined frequencies of exposure by differentiating between unexposed, occasionally exposed (i.e. seldomly or sometimes exposed), and frequently exposed (i.e. monthly or more often).

The SLOSH offensive acts questionnaire incorporated two additional measures of workplace bullying (used in Paper I only); one based on the self-labelling approach and the other on the behavioural experience method (Notelaers & Van Der Heijden, 2021), using the NAQ-R (Einarsen et al., 2009). In the main analyses, these items were dichotomized (exposed/unexposed), on the basis of affirmative responses and the established Swedish cut-offs respectively (Rosander et al., 2024).

Other covariates

In addition to the above-presented exposure and outcome variables, we derived information on a range of sociodemographic, work- and health-related factors. These covariates filled different purposes: for restriction or for the purpose of describing the study sample; for adjustment or stratification in the analyses; for examination of interaction effects; and for consideration of competing events. An overview of these covariates is presented in Table 5.

As an example, the interaction between leadership quality and exposure to workplace bullying was analysed in Paper II. In SLOSH, leadership quality was ascertained using 10 items regarding the occurrence of specific leadership behaviours (e.g. explaining goals, engaging in professional development of the employee) from the subscale Leadership Climate (sourced from The Stress Profile) (Nyberg et al., 2009; Setterlind & Larson, 1995). WEHD measured leadership quality through 8 items, stemming from the Leadership Climate Scale and from different subscales of the second version of the Copenhagen Psychosocial Questionnaire (Pejtersen et al., 2010; Sørensen et al., 2022). For our analyses, we created a binary variable, indicating absence/presence of good leadership quality, based on the sample median.

More information on the choice and operationalization of covariates can be found in the section “Potential confounding” (page 53) as well as in the respective papers.

⁴ An exception to this is in paper II, where the exposed group in the WEHD-sample also included respondents who reported exposure to bullying from external sources only (N=84).

Table 5. Overview of study-specific sociodemographic, work- and health-related covariates.

Covariate	Coding specifications	Source	Papers
Sex	Male/female	LISA/CRS	I, II, III, IV
Age	Age groups in Papers I-III; age in years in Paper IV	LISA/CRS	I, II, III, IV
Marital status	Single/married or cohabiting	SLOSH/CRS	I, II, III, IV
Country of birth	Sweden/outside Sweden	LISA	III
Living with children	Yes/no, only children under 18 years of age included	SLOSH/CRS	I, III, IV
Educational attainment	Low/intermediate/high, corresponding to primary or secondary education, <3 years post-secondary education, ≥ 3 years post-secondary education	LISA/Danish Population's Education Register	I, II, IV
Socioeconomic position	Unskilled worker/Skilled worker/Assistant non-manual employee/Intermediate non-manual employee/Professional or upper-level executive and self-employed	SLOSH: Classification made according to the Swedish socio-economic classification (SEI) by Statistics Sweden	III
Contract type	Permanent/temporary	SLOSH	I, III
Self-employed	Yes/no	SLOSH/WEHD	II
Leadership quality	10 items (SLOSH), 8 items (WEHD). Absence/presence of good leadership quality (decided by median split)	SLOSH: Leadership Climate/ WEHD: Leadership Climate/Copenhagen Psychosocial Questionnaire	II
Supervisory responsibilities	Yes/no	SLOSH	I
Job demands	4 items. Mean score in Paper III, sum score in Paper IV	SLOSH: Job-Demand-Questionnaire/WEHD	III, IV
Decision authority	3 items. Mean score in Paper III, sum score in Paper IV	SLOSH: Job-Demand-Questionnaire/WEHD	III, IV

Covariate	Coding specifications	Source	Papers
Job strain	Yes/no based on combination of high or low job demands/decision authority (decided by median split)	SLOSH/WEHD	II
Violence/threats of violence at work	1 item with response alternatives no, sometimes, monthly, weekly coded 1 to 4	SLOSH	I
Conflicts at work	1 item with response alternatives almost never, seldom, sometimes, often coded 1 to 4	SLOSH	I
Change of employer	Yes/no	SLOSH	II, IV
Baseline depressive symptoms	Sum score of self-reported depressive symptoms	SLOSH: SCL-CD6/WEHD: Major Depressive Inventory (MDI)	IV
SA-CMD before baseline	Yes/no	MIDAS	III
Psychotropic drug purchase before baseline	Yes/no	Swedish National Prescribed Drug Register/Danish National Prescription Register	IV
Full time disability pension benefits	Yes/no	MIDAS	III
Retirement year	Using data on main income source	LISA	III
Emigration	Yes/no, days from survey return to emigration during follow-up	LISA/CRS	IV
Date of death	Yes/no, days from survey return to death during follow-up	Swedish National Cause of Death Register/The Danish Register of Causes of Death	III, IV
Baseline year	2012/2014/2016	SLOSH, WEHD	III, IV

Study designs and analytical approaches

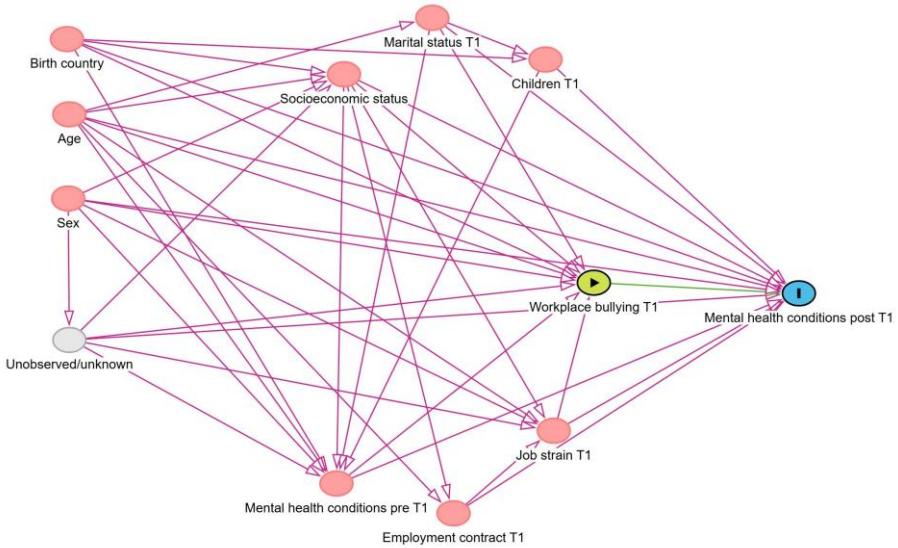
Paper I was designed as a mixed methods validation study, combining qualitative and quantitative methodological approaches. Papers II-IV are prospective cohort studies using survey and/or longitudinal register data. One main advantage of prospective observational studies is the ability to incorporate a temporal dimension into the research questions. This approach allows for a clearer sequencing of exposure and outcome, facilitating the assessment of directionality (Vaisey & Miles, 2017). Additionally, the use of repeated measures enables to study outcomes of changes or onset in exposure. Paper II uses repeated measures of exposure, outcome, and covariates from three survey waves. Paper III uses baseline survey data for exposure and covariates, linked with longitudinal register data for the outcome. Paper IV makes use of repeated exposure measures from two survey waves paired with longitudinal register data for the outcome.

Potential confounding

In studies II to IV, we used directed acyclic graphs (DAGs), drawn based on prior empirical evidence, to identify potential confounding variables, that is, variables associated with both the examined exposure and outcome. In a DAG, the assumed causal relationships between variables are plotted, resulting in a visual causal structure. This structure can be used to help determine which variables that should be adjusted for in analysis aiming to identify if a certain exposure is a cause of certain outcome, without introducing further bias (Shrier & Platt, 2008). As the name implies, a DAG can only visualize unidirectional relationships and does not allow the inclusion of feedback loops or interaction effects. However, in longitudinal models, one can model temporal sequencing across time points, effectively modelling bidirectional relationships over time (Suzuki et al., 2020).

Figure 6 displays a generalized DAG for the association between exposure to workplace bullying and subsequent mental health conditions. For studies II, III, and IV, adapted versions of this DAG were used, tailored to match each study design respectively.

Figure 6. Generalized directed acyclic graph (DAG) for the association between exposure to workplace bullying and subsequent mental health conditions.



Note. Figure created in DAGitty version 3.1.

Prior empirical studies have indicated that women, younger employees, individuals not married or partnered, and individuals in lower socioeconomic positions might face a higher risk of both exposure to workplace bullying and of mental health conditions (Feijó et al., 2019). Consequently, these covariates were considered in all four papers. Further, birth country, cohabitation with children, and contract type are factors that have been associated with either sickness absence and/or mental health conditions (Helgadóttir et al., 2019; Public Health Agency of Sweden, 2019; Swedish Social Insurance Agency, 2020a) and that further could be associated with an increased risk of exposure to workplace bullying (Djurkovic, 2021; Feijó et al., 2019; Rosander & Blomberg, 2021), and were adjusted for in several papers (see Table 5).

Papers II-IV additionally considered the role of other factors in the psychosocial work environment, namely job demands and decision authority (modelled jointly as job strain in Paper II, and as separate constructs in Papers III and IV). Prior research has demonstrated associations between job demands, decision authority, and the interaction thereof (“job strain”) with mental health conditions (Rugulies et al., 2023). In addition, these variables have been suggested to increase the risk of exposure to workplace bullying (Baillien, De Cuyper, et al., 2011; Janssens et al., 2016). These factors could, however, also be considered as mediators on the causal pathway from exposure to workplace bullying to mental health conditions, or even in certain cases be expressions of work-related bullying behaviours. If so, adjustment for these variables

would lead to underestimated associations. Therefore, we aimed to present both models with and without adjustment for these conditions. Lastly, Papers II-IV all took prior mental health conditions into account, to decrease the possibility of reverse causality.

After identifying potential confounding variables (“minimally sufficient adjustment sets”), we addressed these by either including these covariates in our statistical models, by applying propensity score matching (see details in Paper III), and/or by applying certain inclusion criteria. While covariate adjustment includes confounders directly in the outcome model, propensity score matching estimates the probability of exposure given observed covariates and matches individuals with similar scores to balance covariates before outcome analysis (Austin, 2011). The latter has been suggested preferable in cases of many confounders and/or few outcome cases (Austin, 2011; Benedetto et al., 2018). However, neither of these techniques can adjust for confounding from unmeasured covariates. This issue can still be addressed using certain types of statistical models or study designs. In Paper II, the risk of confounding from unmeasured, time-stable covariates (e.g. personality traits, childhood experiences) was limited in analyses by utilizing intra-individual changes. In Paper IV, we instead made use of E-values to quantify the impact that any unmeasured confounding might have on our results.

Analytical methods

Qualitative content analysis

Qualitative content analysis, as described by Graneheim and Lundman (2004), is a systematic method for interpreting meaning from text. It can be applied to text data from various sources, including interviews, observations, and responses from open-ended survey items (Bengtsson, 2016). The interpretations can be of different levels, focusing either on describing what the text says (its manifest content) or analysing its underlying meaning (its latent content) (Graneheim & Lundman, 2004). Typically, the analysis starts with full-text readings of the material and identification of condensed meaning units (segments of text that are contextually or content-wise related). The meaning units are assigned with a code, reflecting their primary content, and codes are grouped to categories consisting of similar codes. Ideally, these categories should be mutually exclusive. Additionally, parts of the text addressing a specific content can also be sorted into broader content areas. (Graneheim & Lundman, 2004).

We used qualitative content analysis in Paper I, with the aim of examining whether respondents’ experiences of personal persecution at work corresponded to the conceptual understanding of workplace bullying, as described in previous literature. The analysis focused on the manifest content of open-ended survey responses and followed an abductive approach.

Measurement agreement

Measurement agreement refers to the degree to which different items or instruments provide consistent results when assessing the same construct (Watson & Petrie, 2010). In Paper I, we used Cohen's kappa as well as correlational statistics to examine measurement agreement between traditional measures of exposure to workplace bullying (a self-labelling item and the NAQ-R) and the PP-item, designed to assess exposure to workplace bullying in SLOSH. Correlation coefficients quantify the direction and degree of relationships between variables while Cohen's kappa can be used to evaluate whether two measures classify individuals consistently (here as exposed and unexposed) beyond what can be expected by chance (Watson & Petrie, 2010).

Logistic regression analysis

Logistic regression analysis is a statistical technique that can be used to assess the association between one exposure variable and a categorical outcome variable, while adjusting for several covariates. The strength of the association is presented as odds ratios. When the exposure is categorical (e.g. exposed/unexposed to workplace bullying), the odds ratio corresponds to the odds of the outcome occurring in the exposed versus that in the unexposed group. (Hosmer & Lemeshow, 2000).

In Paper I, we used logistic regression analysis when examining the predictive validity of a measure of workplace bullying included in SLOSH, in relation to self-reported depression and anxiety. In Paper III, we employed logistic regression analysis to examine reverse associations (between SA-CMD and later exposure to workplace bullying). To account for the within-pair dependency of the propensity score-matched sample, we used conditional logistic regression (Austin, 2011).

Structural equation modelling

Structural equation modelling (SEM) is a statistical framework, incorporating a set of methods to model complex relationships between variables that are either observed or latent (hypothetical constructs) (Kline, 2016). When using SEM with observed variables only, it can be thought of as an extension of multiple regression, where multiple linear relationships (directed and non-directed) can be simultaneously modelled. By specifying several models, based on theoretical and empirical evidence, and comparing how well these structural models fit the actual data, one can gain an understanding of the direction of associations between the included constructs (Little, 2013). To account for non-normality, SEM can be estimated using diagonally weighted least squares when the included variables are categorical or dichotomous (Bandalos, 2014). Effect estimates are typically presented as standardized or unstandardized regression coefficients. Interaction effects can be included in SEM-analyses, and are typically modelled on the additive scale (Kline, 2016).

In Paper II, both traditional cross-lagged panel models and dynamic panel models with fixed effects (DPM-FE) were used to model the association between workplace bullying and symptoms of anxiety (modelled as observed variables), using data from three consecutive survey waves. This way, concurrent, longitudinal, and reverse associations between workplace bullying and anxiety symptoms could be examined using both a between- and within-individual approach (Allison et al., 2017). The rationale for using this approach was that we assumed that time-stable factors (such as personality traits or traumatic childhood experiences), for which we lacked data, could confound the bullying-anxiety relationships, and potentially lead to overestimated associations. To explore this, we used two complementary statistical approaches, where one by design accounted for confounding from time-stable covariates (DPM-FE) and one did not. Differences in the magnitude of effect estimates between the two analyses may thus reflect the influence of time-stable confounding although other methodological differences could also play a role.

Survival analysis

Cox proportional hazards regression (used in Papers III and IV) is a type of survival analysis, used when the outcome of interest is of time-to-event type (Allison, 2014). This was applied in Paper III and IV when we examined the relationship between exposure to workplace bullying and incident spell of SA-CMD/incident treatment with psychotropic medication respectively. We chose to follow individuals for up to two years, using months since baseline survey return as the underlying time scale. These models estimate hazard rates as effect estimates, which corresponds to the instantaneous rate of failure per unit of time (e.g. the risk of SA-CMD at a given moment), conditional on having survived (meaning not having had SA-CMD) up until a certain time point. When comparing two groups, such as the exposed and unexposed, the hazard rate ratio is used to describe the difference in hazard rates between the two groups over the chosen time period.

In general, the hazard rate ratio represents the average “treatment effect”, reflecting the average effect of an exposure across the whole study population. In cases when matching is performed, like in Paper III, the hazard rate ratio instead represents the average “treatment” effect for the treated, thus the average effect of the exposure specifically for those who were actually exposed. (Austin, 2014).

When using Cox proportional hazards regression, the hazard rate ratio is assumed to be constant over the chosen follow-up period (Allison, 2014). In our data, we checked the proportional hazards assumption through visual inspection of the log-log plot and by using Schoenfeld’s global test, as well as through comparing models allowing the hazard rate to vary with time (using cubic splines) with models that assumed time-constant hazard rates.

Meta-analysis

Two papers in this thesis (Papers II and IV) utilize data from both Sweden and Denmark. Legal restrictions prohibited us from pooling individual-participant data (IPD) from these countries. Instead, effect estimates from country-specific analyses were pooled using meta-analysis (sometimes referred to as a one-step IPD-meta analysis approach, see for example Burke et al, 2017) As the analyses included effect estimates from only two data sets, a fixed-effects meta-analytic model was chosen, assuming minimal between study-variability (Bender et al., 2018). The fixed-effects approach was further justified by the fact that we assumed great similarities in the underlying populations and arranged the two data sets in almost identical ways (Bender et al., 2018).

Ethical considerations

All empirical papers for this thesis involve human subjects and consider sensitive personal data regarding health. The research has been conducted according to the Declaration of Helsinki (World Medical Association, 2013) and adhering to the ethical guidelines and principles outlined by the Swedish Research Council (2017).

In conjunction with each data collection wave, all invited participants to SLOSH are given information about the purpose of the questionnaire, that their participation is voluntary, and that they have the right to withdraw from participation at any time, without explaining why. They are further informed about linkages to registers as well as how the results will be distributed. This information is given in written text. Individuals who return the survey are considered to have given informed consent. Several measures are taken to secure personal integrity and minimize the risk of backward identification of study subjects. All data collection is firstly handled by Statistics Sweden and pseudonymized before being transferred to the SLOSH core research group. Procedures for requesting data guarantee that researchers only are granted access to such data that is relevant to their specific research questions and to projects that have received ethical approval. Whenever applicable, first-hand data management (e.g. calculating sum scores for existing scales, estimating the number of days until an event has occurred) is conducted by the SLOSH core research group, to further reduce the amount of details in the data set that is available to the researcher. Quantitative findings are presented on an aggregated level, while qualitative data are presented in a manner that maintains confidentiality of participants. Similarly, informed consent has been collected from participants in WEHD. Microdata is stored at Statistics Denmark, and can only be accessed online through an affiliation with a Danish authorized environment (Thygesen et al., 2011). Researchers are only allowed to present findings on an aggregated level.

Ultimately, this thesis seeks to examine mental health outcomes of workplace bullying and contribute with knowledge that, in the long run, might help improve the work environment and health of the working population. Thus, in weighing the costs and benefits, the benefits (e.g. increased risk awareness) are considered to outweigh the potential costs (e.g. potential integrity breaches) for the research participants involved.

SLOSH has obtained ethical approval from the Regional Ethical Review Board in Stockholm [#2012/373-31/5, #2006/158-31, #2008/240-32, #2008/1808-32, #2010/0145-32, #2012/373-31/5, #2013/2173-32, #20152187, #2015/2298-32, #2017/25-35-32, #2022-06686-02, #2025-02734-01]. WEHD has been registered and approved by the Danish Data Protection Agency. Ethical approval from the Danish National Committee on Health Research Ethics is not needed for register- or questionnaire-based research in Denmark.

Results

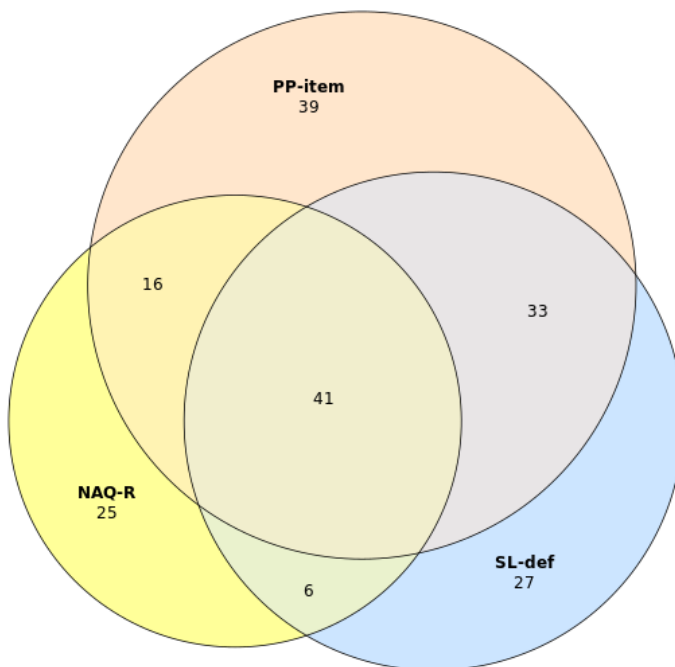
This chapter presents the aim(s) and the main findings for each of the four papers included in this thesis.

Theoretical and psychometric properties of the PP-item as a measure of exposure to workplace bullying (Paper I)

This mixed-methods study aimed to assess the validity of the PP-item, traditionally used as a measure of exposure to workplace bullying in SLOSH and in SWES. Qualitative content analysis was performed on a subset of respondents to one SLOSH-wave who had provided free-text responses to a survey question asking them to describe their experiences of personal persecution at work (N=445). Quantitative analyses, involving tests of measurement agreement, correlational statistics, and logistic regression analyses, were performed on a sample of respondents from the SLOSH offensive acts questionnaire (N=1148).

Qualitative findings showed that individuals described the experience of personal persecution as including exposure to an array of negative behaviours, including personal devaluation, social exclusion, and actions undermining work performance or professional status. The quantitative analyses found that the PP-item showed moderate overlap with established measures of workplace bullying (i.e. using the self-labelling and the behavioural measurement method respectively). The degree of overlap was similar to how the established measures overlapped with each other (Figure 7). The PP-item demonstrated the highest correlation with the self-labelling approach as well as with the subscale of NAQ-R capturing person-related behaviours. Correlations with workplace violence were low, whereas correlations with workplace conflicts were moderate. The PP-item was further associated with subsequent symptoms of depression and anxiety in a manner expected for workplace bullying, and in a similar fashion as established measures of workplace bullying (results for other measures not included in the paper).

Figure 7. Frequencies of all exposed respondents (N=187) who were classified as exposed (irrespective of frequency) according to each unique or combined measure of workplace bullying.



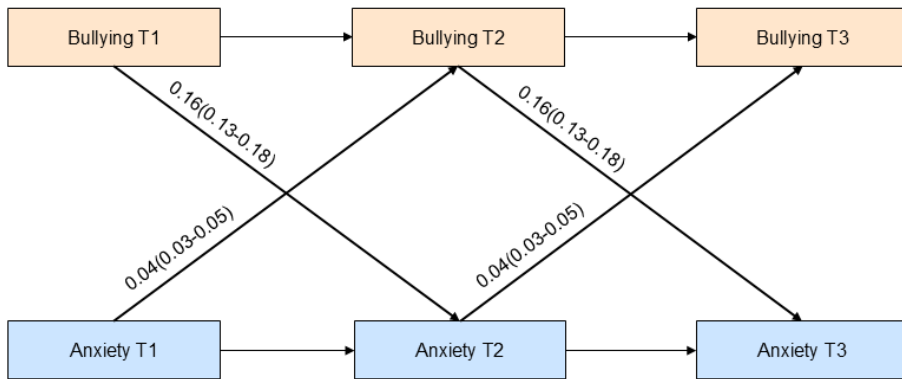
Note. PP-item=Personal persecution-item; NAQ-R=Negative Acts Questionnaire-Revised; SL-def=Self-labelling with definition.

Concurrent, prospective, and bidirectional associations between workplace bullying and anxiety symptoms (Paper II)

This study aimed to examine potential reciprocal associations between workplace bullying and self-reported symptoms of anxiety, as well as to examine the buffering potential of good leadership quality. The analyses were based on survey data from both Swedish and Danish workers (N=13 491), using data from three consecutive survey waves per participant. Associations were examined through structural equation modelling, using both a between-individual approach (comparing exposed individuals to unexposed individuals) and a within-individual approach (comparing individuals to themselves before and after changes in exposure status). Across the study waves, 8–9% of participants in SLOSH and 11–12% in WEHD reported exposure to workplace bullying. At baseline, the mean sum score of self-reported anxiety symptoms was 1.8 (SD=2.5) on a scale ranging from 0 to 16.

When comparing exposed to unexposed individuals, the best-fitting model indicated bidirectional prospective associations between exposure to workplace bullying and anxiety. While bullying exposure was associated with increased levels of anxiety symptoms two years later, the reverse relationship was also supported – higher initial levels of anxiety symptoms were associated with an increased risk of subsequent exposure to workplace bullying, also when accounting for sociodemographic and work-related factors such as time-varying job strain (Figure 8).

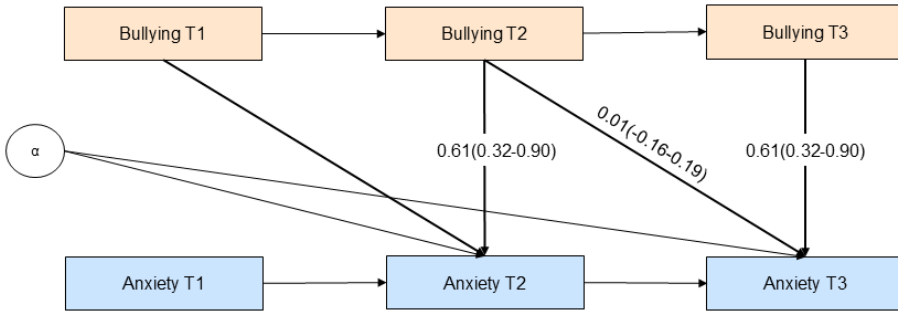
Figure 8. Associations between exposure to workplace bullying and anxiety symptoms.



Note. Results displayed as pooled regression coefficients and 95% confidence intervals from cross-lagged panel models.

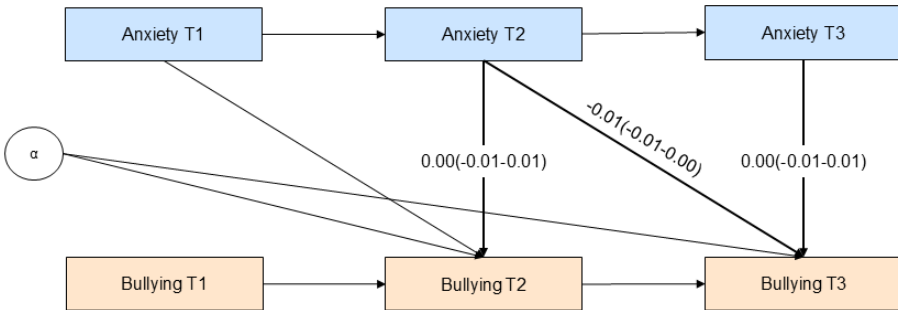
By contrast, when modelling intra-individual changes (by design adjusting for time-stable characteristics), we found that workplace bullying was associated with concurrent, but not lagged, increases in anxiety symptoms, also when adjusting for time-varying job strain (Figure 9). Moreover, these analyses did not find support for reverse associations (Figure 10).

Figure 9. Concurrent and lagged associations between exposure to workplace bullying and anxiety symptoms.



Note. Results displayed as pooled regression coefficients and 95% confidence intervals from dynamic panel models with fixed effects. α =alpha, latent variable representing all time-stable characteristics.

Figure 10. Concurrent and lagged associations between anxiety symptoms and exposure to workplace bullying.



Note. Results displayed as pooled regression coefficients and 95% confidence intervals from dynamic panel models with fixed effects. α =alpha, latent variable representing all time-stable characteristics.

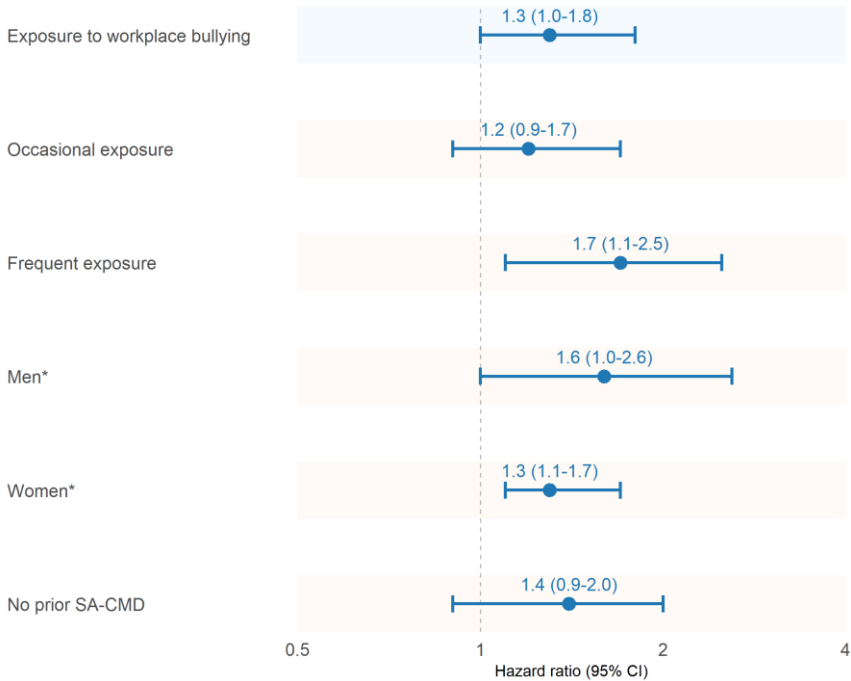
Comparisons of different models showed that the adjustment for job strain only had a minor impact on the examined associations (data not shown in published paper). Furthermore, employee ratings of leadership quality did not seem to influence the associations. Employees experiencing good leadership quality were similarly affected (in terms of anxiety symptoms) by bullying as those who perceived less favourable leadership quality. All examined associations followed a largely similar pattern in both SLOSH and WEHD, among women and men (albeit with some variation across countries in sex-stratified analyses), and among individuals who remained employed in the same organization over the entire study period, as well as in additional analyses that accounted for missing data.

Prospective and bidirectional associations between workplace bullying and sickness absence due to common mental disorders (Paper III)

The first aim of this study was to examine the two-year prospective association between workplace bullying and sickness absence due to common mental disorders (SA-CMD). We did so by using survey data from gainfully employed individuals across three waves of SLOSH (N=19 152). Among these, 8.4 percent were exposed to workplace bullying. These were matched to an unexposed individual, using propensity score–matching, creating a matched sample of 3216 individuals, balanced on sociodemographic and work-related factors, including job demands and decision authority. In the matched sample, 203 incident cases of SA-CMD were identified through register linkage.

Using Cox proportional hazards regression, we observed a higher hazard of incident SA-CMD among exposed individuals relative to their matched unexposed counterparts (Figure 11). When excluding individuals with prior SA-CMD from the analysis, estimates remained similar, but with confidence intervals showing greater uncertainty. We further found that the association followed a dose-response pattern, with those experiencing frequent (at least monthly) exposure to workplace bullying having the greatest hazard of SA-CMD. Similar patterns were found when repeating the analyses in the full sample using traditional covariate adjustment. When stratifying the analysis by sex (using the full sample), the association was observed for both men and women (results not included in the published paper).

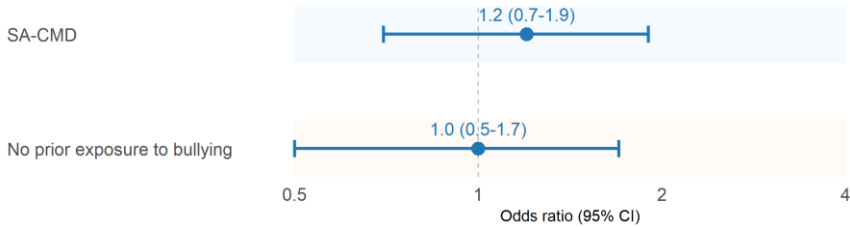
Figure 11. Associations between exposure to workplace bullying and incident sickness absence due to common mental disorders.



Note. Results displayed as hazard ratios from Cox proportional hazards regression models. SA-CMD=Sickness absence due to common mental disorders. *Analyses performed in full sample.

A second objective of this study was to examine the reverse association. That is, if having a registered episode of SA-CMD (during an 18-month period) increased the risk of subsequent exposure to workplace bullying upon returning to work. This association was examined in a subsample, consisting of those individuals who had completed two consecutive in-work surveys. No statistically significant association was observed between SA-CMD and subsequent exposure to workplace bullying, neither in the propensity score-matched sample (N=552), in the full sample (N=10 932) using traditional covariate adjustment, nor when restricting the sample to individuals who had not previously been exposed to bullying (Figure 12).

Figure 12. Associations between sickness absence due to common mental disorders and subsequent exposure to workplace bullying.



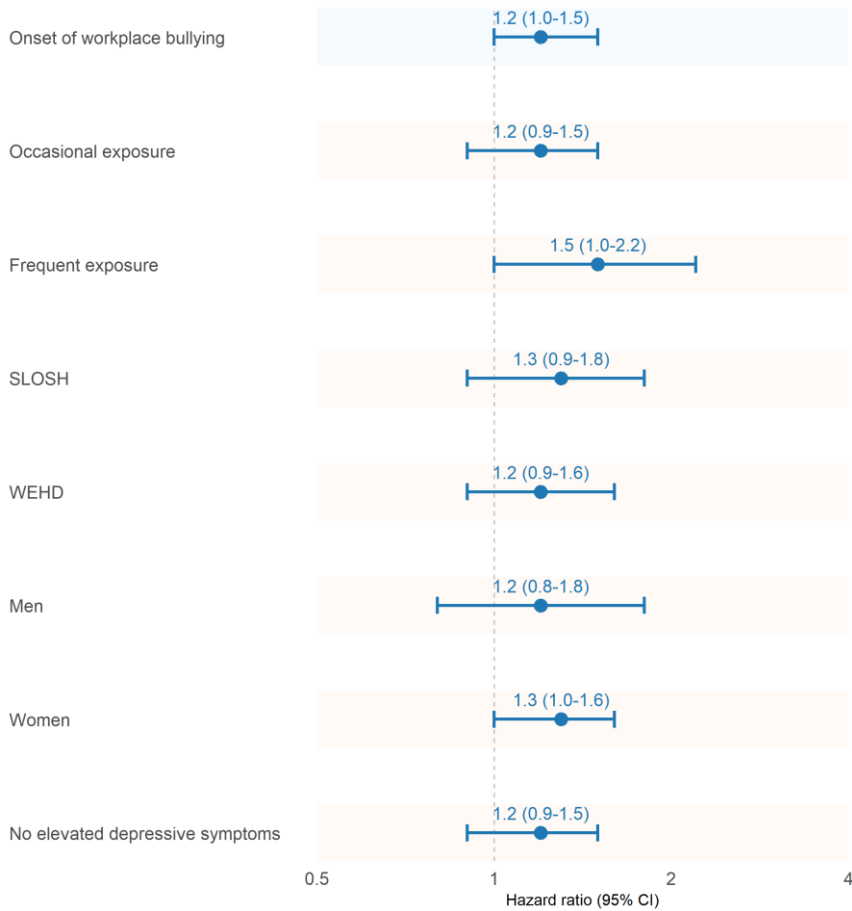
Note. Results displayed as odds ratios from conditional logistic regression models. SA-CMD=Sickness absence due to common mental disorders.

Prospective associations between onset of workplace bullying and initiation of psychotropic medication (Paper IV)

In Paper IV, we sought to emulate a target trial to examine the association between onset of workplace bullying and subsequent use of psychotropic medication (using ATC-codes N05B, N05C, and N06A corresponding to anxiolytics, hypnotics and sedatives, and antidepressants). The analysis included both Danish and Swedish workers with no recent history of bullying exposure or psychotropic medication use (Total N=25 309). In total, 5.9% reported onset of workplace bullying. Cox proportional hazards regression was used to estimate the risk of medication use during the two years following onset of bullying exposure. During follow-up, 1084 incident cases of psychotropic medication treatment were identified, including 465 cases of antidepressant treatment.

After adjusting for sociodemographic variables and baseline year, we found that onset of workplace bullying was associated with a greater hazard of initiating any type of psychotropic treatment. However, when additionally adjusting for baseline self-reported depressive symptoms as well as baseline levels of job demands and decision authority, the association was slightly attenuated, with the lower confidence interval including unity (Figure 13).

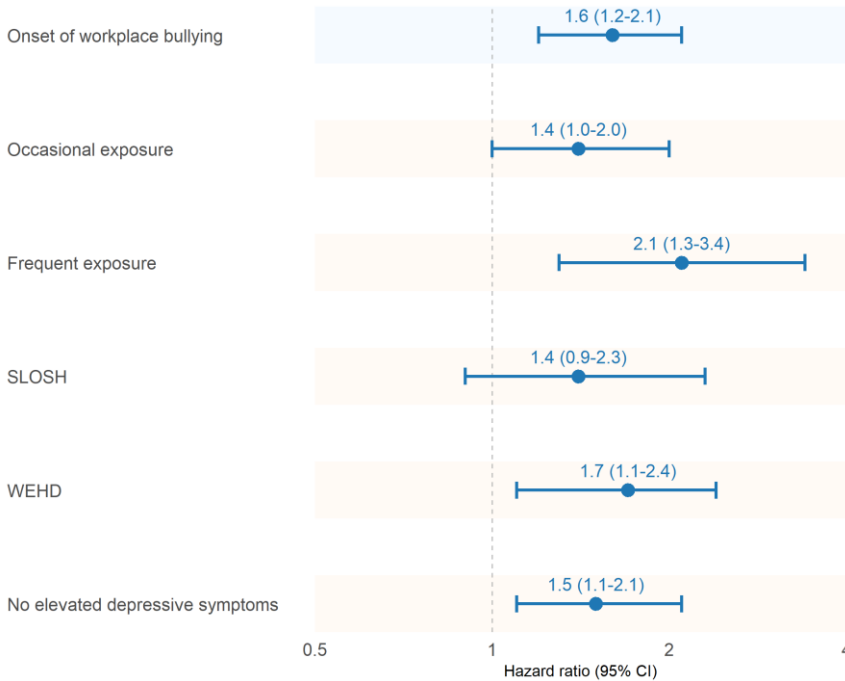
Figure 13. Associations between onset of workplace bullying and initiation of any psychotropic treatment.



Note. Results displayed as hazard ratios from cohort-specific Cox proportional hazards regression models, pooled using fixed-effects meta-analysis.

When restricting the analysis to antidepressant medication, the association was clearer and remained statistically significant also in the fully adjusted models (Figure 14).

Figure 14. Associations between onset of exposure to workplace bullying and initiation of antidepressant medication.



Note. Results displayed as hazard ratios from cohort-specific Cox proportional hazards regression models, pooled using fixed-effects meta-analysis.

For both outcomes, a dose-response pattern was observed, with more frequent bullying being linked to a greater hazard of initiating any psychotropic treatment as well as to a greater hazard of initiating use of antidepressants.

The results were fairly consistent across both SLOSH and WEHD and among women and men, though some variation in effect estimates was observed across countries and sex strata. Similar patterns were further observed when the analyses were restricted to individuals who remained employed in the same organization at baseline and at the onset of exposure, as well as when excluding participants reporting elevated depressive symptoms at baseline. Moreover, the associations remained largely unchanged when the follow-up period was adjusted to be able to include potential immediate treatment initiation. Sensitivity analysis indicated that unmeasured confounder(s) would need to increase the risk of both workplace bullying onset and psychotropic or antidepressant treatment by 1.6 and 2.1 times to fully explain the observed associations.

Methodological considerations

No research is without its flaws. This section will describe the potential sources of error of relevance for this thesis, with an emphasis on Papers II-IV. Errors may be random or systematic, where the former are errors occurring by chance, potentially affecting the results in any direction. In contrast, systematic errors may systematically affect (bias) the magnitude of associations in one direction. In order to achieve unbiased estimates, systematic errors must be addressed through different techniques (Rothman & Greenland, 2014). Thus, where applicable, the handling of relevant systematic errors will be discussed, along with how they might have influenced the results. The chapter will end with a discussion of the generalizability of the findings from this thesis.

Selection bias

Selection occurs when those who take part in the study systematically differ from the intended target population. Selection might generate biased results when associated with the exposure and the outcome. In other words, if the association between the exposure and the outcome is different among study participants and the population of interest, including eligible but non-participating individuals, this might suggest that selection bias is present (Rothman & Greenland, 2014). Given lack of data for non-participants, selection bias is generally hard to assess, and especially so in our case, when the exposure (workplace bullying) is self-reported and thus requires survey participation at some point in time.

As described in the methods section, both SLOSH and WEHD have been affected by non-response and attrition at several stages, a common issue in longitudinal survey research. Not all that were invited to the Labour Force Survey (LFS) took part in it, and not all individuals who participated in the LFS continued into the Swedish Work Environment Survey (SWES). Moreover, only a subset of those later participated in SLOSH, and not all of them participated in SLOSH on repeated occasions. Likewise, WEHD has been affected by non-response at baseline and attrition across waves. For both SLOSH and WEHD, prior studies have demonstrated that baseline participation is associated with both sociodemographic and health-related factors and

that these differences become more pronounced over time (Magnusson Hanson et al., 2018; Sørensen et al., 2025), which may have introduced selection bias. Although weighting could potentially have been used to address the selection that occurred from stepwise selection from LFS to SWES to SLOSH, the longitudinal structure of the data, with participants entering at different waves and having different baseline LFS/SWES years, made this approach complex, and it was therefore not applied in the included studies.

Additional selection might further have been introduced through our applied inclusion criteria. In all papers, we restricted the samples to those who were gainfully employed, thus excluding individuals who potentially already left the labour market due to poor health after exposure to workplace bullying. This form of health selection, or differential loss to follow-up, is commonly referred to as the healthy worker effect, whereby occupational cohorts tend to consist of individuals with a more favourable health- and mortality situation compared to the general population (Pearce et al., 2007). Criteria for gainful employment differed between WEHD and SLOSH. In WEHD, employment corresponded to roughly less than one hour per week on average during a two-month reference period, whereas SLOSH defined gainful employment as working at least 30% of full-time (approximately 12 hours per week) during the past 3 months, potentially increasing selection towards more stable workers compared with WEHD. In both Papers II and IV, as well as in the reverse analysis in Paper III, a prerequisite for inclusion was repeated survey participation while being gainfully employed, which makes these studies even more susceptible to selection bias. Individuals exposed to workplace bullying at or between data collection time points may have subsequently developed poor mental health and, as a result, left the labour market temporarily or permanently. These individuals would then no longer be eligible as gainfully employed in the next SLOSH survey, which could lead to an underestimation of the association between workplace bullying and mental health outcomes. Additionally, restricting the sample to individuals with valid data on all variables of interest (as in Papers II–IV) could theoretically have introduced selection bias if missingness was related to workplace bullying and/or mental health conditions. However, in a sensitivity analysis in Paper II using full information maximum likelihood (FIML), our results were similar, suggesting that the use of full cases did not substantially affect these findings. Moreover, the proportion of cases with missing information was generally low in our studies, further decreasing the risk of this introducing selection bias.

In Papers I and II, we have examined selection through attrition analyses. In addition to confirming the previously known attrition patterns in SLOSH and WEHD, we found a higher attrition rate among participants with increased anxiety levels in both cohorts. Since workplace bullying was associated with increased anxiety, this pattern suggests that attrition may not be completely at

random and could imply a potential underestimation of the examined association, particularly if those experiencing the most severe anxiety were less likely to remain in the study. In Paper I, participants in the SLOSH offensive acts sample differed from non-participants in age, potentially reflecting differences in work experience. However, they did not differ in terms of exposure to workplace bullying as measured by the PP-item, suggesting that selection related to the exposure itself was limited.

No attrition analysis was undertaken for Paper III, as the study design did not require repeated participation and therefore information on non-respondents was not available. Since the study sample for Paper IV largely overlapped with that used for Paper II, no additional attrition analysis was performed.

In contrast to Papers I and II, which relied on self-reported outcome measures and required repeated survey participation, Papers III and IV used register-based indicators of mental health conditions. Follow-up in these studies did not depend on continued participation in surveys, nor on individuals remaining in employment over a longer period. Consequently, the risk of selection during follow-up is likely reduced. The coverage and quality of Swedish administrative registers are generally high, although slightly lower for certain population subgroups such as recent migrants or those with unstable employment histories (Bodin et al., 2022; Careja & Bevelander, 2018). However, these groups constitute only a small proportion of our sample, which is likely to reduce the potential impact of selection out of the study on the results.

In summary, we cannot rule out that the selection processes in our studies might have introduced bias. In such cases, this bias is most likely to have caused an underestimation of the associations between workplace bullying and mental health conditions, as individuals with poorer mental health or more adverse work conditions were less likely to be included or retained in the analytical samples.

Information bias

Information bias may arise from the choice of measurement of central variables, as well as from how the collected data is classified. A chosen indicator may misrepresent the underlying construct (often referred to as measurement error), whereas inappropriate categorization can result in misclassification. Both measurement error and misclassification may bias the estimated associations in different ways, depending on whether the misclassification is differential or non-differential with respect to exposure or outcome (Rothman & Greenland, 2014).

Bias related to the measurement of workplace bullying

While the results of Paper I support the validity of the PP-item as a measure of workplace bullying, exposure misclassification might still be an issue. In all four papers, exposure to workplace bullying was treated as a dichotomous variable, complemented with a categorical item based on exposure frequency in Papers III and IV. Solely relying on the dichotomous variable might have caused exposure misclassification, as also individuals reporting exposure to workplace bullying “sometimes” during the reference period were classified as exposed. It can be questioned whether such a frequency of exposure actually corresponds to bullying or rather represents isolated negative acts. However, it has been proposed that even single negative acts can be considered bullying if their consequences are repeatedly experienced (Einarsen et al., 2011). For example, an individual may have essential work equipment taken away once but then be forced to work with inadequate equipment for a prolonged period.

The measurement of workplace bullying also differed between the cohorts, potentially influencing our results. WEHD used a self-labelling item and provided a definition of workplace bullying, whereas SLOSH used the PP-item. Results from Paper I demonstrated a moderate overlap between these approaches, suggesting that they capture, at least partly, the same phenomenon, albeit with the PP-item potentially including also less severe forms of mistreatment. In addition, the exposure reference period varied between the cohorts. A higher prevalence of workplace bullying was observed in WEHD compared to SLOSH, which can potentially reflect the longer time frame applied in WEHD. We did not, however, test this difference for statistical significance. Previous research has not observed significant differences in prevalence between studies using six- and twelve-month recall periods (Dhanani et al., 2021). As a result, some individuals previously exposed to workplace bullying may have been classified as unexposed in SLOSH due to the shorter recall period, whereas they would be classified as exposed in WEHD, potentially affecting observed associations. It is difficult to tell how a longer recall period would influence the observed associations. While, in our case, a longer recall period might capture more cases, these additional individuals may differ in risk. If they experienced more distant exposure, and the mental health outcomes of bullying are immediate, their prospective risk for mental health conditions may be lower than those recently exposed, potentially diluting the association. Conversely, if the additional cases represent prolonged or repeated exposure, cumulative stress may increase risk, potentially strengthening the association. Importantly, these differences then reflect “true” variations in risk rather than differential misclassification.

The papers in this thesis generally focused on workplace bullying conducted within the organization, meaning bullying enacted by co-workers, su-

periors or subordinates. However, in the WEHD sample in Paper II, approximately 13% of the exposed group reported bullying by external sources only, such as clients, students, or customers. While seldom studied, evidence suggests that external bullying may be less strongly associated with depressive symptoms, as compared to internal bullying (Török et al., 2016). Assuming this is true also for anxiety, including these individuals in the exposed group could have led to a slight underestimation of the association between workplace bullying and anxiety symptoms. In hindsight, restricting the exposed group in WEHD to only include those exposed by internal sources only, as done in Paper IV, would thus have been preferable.

Bias related to the measurements of mental health conditions

The papers included in this thesis used different indicators to assess mental health conditions. This was a deliberate choice, with the intention of capturing mental health outcomes of varying degrees of severity and potentially generated via different explanatory mechanisms. In addition, all employed indicators have different strengths and limitations, and may thus act complementary when aiming to understand the link between workplace bullying and mental health conditions. As depicted in Figure 1, we aimed to assess adult mental health conditions, in particular depression and anxiety, encompassing both subclinical states and diagnosed disorders. In Figure 1, the constructs of interest are clearly separated from each other, which is likely not the case in reality, where mental disorders may overlap, and the distinction between subclinical and clinical states might be blurred (Kendler, 2016).

Self-reported mental health conditions

In Papers I and II, we relied on self-reported data on depression and anxiety, using the SCL-CD6 and the SCL-ANX4 scale, respectively. In Paper I, previously identified cut-offs were used to classify individuals with symptoms likely indicative of a clinical diagnosis. In Paper II, we instead used the sum score of the SCL-ANX4 to model anxiety symptoms. While the results suggested that workplace bullying increased anxiety symptoms, this does not necessarily translate to an increased risk of clinically diagnosed anxiety disorders.

The SCL-ANX4, as part of the CMDQ, has previously demonstrated good psychometric properties in a sample of Danish working-aged individuals and correlates strongly with the presence of diagnosed anxiety disorders according to the ICD-10 (codes F40-49, excluding somatoform disorders) (Christensen et al., 2005). In our paper, we calculated a sum score by adding responses (0-4) from each item, but an alternative option is to dichotomize each question before summing. However, the first option has shown better performance characteristics and better predictive validity in relation to anxiety disorders (Christensen et al., 2005; Søgaard & Bech, 2009).

Similarly, the SCL-CD6 has demonstrated high unidimensionality, and a cut-off of 17 has been used to indicate major depressive disorder, proposed using a sample from SLOSH (Magnusson Hanson et al., 2014). However, only around 6% of individuals scoring above 17 points were subsequently identified with a diagnosis of depression in the Swedish National Patient Register (NPR), within the following year (Magnusson Hanson et al., 2014). This discrepancy might reflect that the NPR captures primarily severe cases of depression requiring hospitalization or outpatient care, or that the scale-cut off includes individuals with subclinical symptoms. Consequently, when using this indicator, our findings mainly reflect associations between workplace bullying and elevated depressive symptoms, rather than clinically diagnosed depression.

It is important to note that self-reported measures of mental health conditions are vulnerable to influences such as social desirability, stigma, and individual respondent characteristics (Rugulies, 2012), which may result in underreporting. Since there is no indication that such underreporting differs systematically between those exposed and unexposed to workplace bullying, any resulting bias is likely to be non-differential. In most cases, non-differential misclassification of the outcome biases the measure of association toward the null (Pearce et al., 2007), meaning that the observed relationship between workplace bullying and self-reported depression/anxiety may be underestimated. An exception is if underreporting reduces sensitivity in detecting cases of poor mental health, but specificity remains perfect (i.e., no false positives), in which case relative measures of association (e.g., risk ratios or odds ratios) remain unbiased (Pearce et al., 2007).

Finally, when both exposure and outcome are assessed via the same method (as in Papers I and II, relying on self-reported data), there is a potential risk that common method variance may partly explain the observed covariance, and thus risk to affect the effect estimates (Podsakoff et al., 2024).

Register-based mental health conditions

In Papers III and IV, mental health conditions were assessed using national register data. In Paper III, we focused on sickness absence spells with a corresponding clinically assessed diagnosis of mood or affective disorders, anxiety disorders, or stress-related disorders (corresponding to ICD-10 codes: F.30-39 and F40-F48). A Swedish report from 2020 indicated that around half of all sickness absence spells within these diagnostic groups are attributable to reaction to severe stress, and adjustment disorders (F43) (Swedish Social Insurance Agency, 2020a), however our data did not allow us to distinguish between different diagnosis.

Importantly, sickness absence data only reflects instances where one's health status impairs one's work ability (Kivimaki et al., 2003). This measure therefore not only captures the presence of a diagnosis, but also its functional consequences, which can vary largely depending on both the severity of the

diagnosis and on contextual factors, including the work context itself. For instance, in Sweden, mental health-related sickness absence is more common in certain occupations, with the risk being particularly high in public administration, education, and health and social care (Swedish Social Insurance Agency, 2020a). Furthermore, since a medical certificate is required for longer absence spells, the measure is likely also influenced by help-seeking behaviour (Wallerblad et al., 2012). Consequently, the measure reflects a combination of one's mental health status, help-seeking behaviour, and available coping resources at work (Alexanderson, 1998; Henderson et al., 2011). As such, it may be a conservative measure of mental health conditions, not capturing milder forms of mental disorders with less functional impairment, or situations where individuals continue working despite symptoms. This limitation is particularly relevant in the context of this thesis, where this outcome is discussed as a measure of mental health conditions.

In Paper IV, we used redeemed psychotropic medication as an indicator for depressive and anxiety disorders, and specifically antidepressant medication as an indicator of depression. In Sweden and Denmark, psychotropic medication can only be prescribed by a medical doctor, thus, also this measure might be influenced by help-seeking behaviour. Yet, both Swedish and Danish findings have suggested that psychotropic medications are not exclusively prescribed for depressive and anxiety disorders, but can also be used for other mental disorders, as well as for physical problems, including pain (Gardarsdottir et al., 2007; Henriksson et al., 2006; Thielen et al., 2009). Our data did not allow us to ascertain the specific indication (e.g. associated medical diagnosis) for which the medication was prescribed, meaning that misclassification might have occurred when using this measure as an indicator for depressive and anxiety disorders. Additionally, not all individuals with depressive and anxiety disorders receive pharmacological treatment (Forslund et al., 2020; Weye et al., 2023). Moreover, the register data we used only reflects redeemed medication, and might thus further be influenced by treatment adherence. Consequently, outcome misclassification might have occurred. We can, however, assume that such misclassification is likely to be predominantly non-differential, risking to dilute the examined associations (Pearce et al., 2007).

Across Papers III and IV, outcome misclassification can have occurred due to incomplete ascertainment of depressive and anxiety disorders in the register-based data. Individuals with untreated mental health conditions, with milder mental health conditions treated in primary care, but not resulting in sickness absence or redeemed psychotropic medication, as well as individuals with more severe conditions managed exclusively in specialist care, may have been misclassified as non-cases. This would primarily result in false negatives and, provided that misclassification is unrelated to exposure status, would be expected to attenuate the estimated associations between workplace bullying

and mental health conditions. Although diagnostic interviews could have provided a more accurate assessment of depressive and anxiety disorders, this was not feasible within the scope of the present studies.

Confounding bias

Confounding, often described as a mixing of effects, is a concern in all observational studies (Pearce et al., 2007). Traditionally, confounding is understood as occurring when a variable, associated with the exposure and the outcome, albeit not on the causal pathway, is not properly accounted for, and thus influences the examined association, exacerbating or attenuating it, or even changing the direction of effects (Rothman & Greenland, 2014). In newer definitions, confounding refers to a situation when exposed and unexposed groups are not exchangeable, due to lack of adjustment of confounder variables (Hernán et al., 2008). Residual confounding, on the other hand, refers to confounding that remains even after adjustment, often because the confounders were measured imprecisely, categorized inappropriately, or that some confounders were unmeasured (Rothman & Greenland, 2014).

It is important to identify and correctly control for confounding variables, especially when the intent is to estimate causal associations. In this thesis, bias from confounding is mainly a concern for Papers II-IV, as Paper I primarily focused on measurement properties rather than causal relationships. To address confounding, we employed several strategies at both the design and analysis stages.

Across Papers II-IV, we systematically used directed acyclic graphs (DAGs) for mapping the assumed underlying causal structure of the examined associations. These DAGs were informed by previous literature, and thus included all variables deemed relevant for the association between exposure to workplace bullying and mental health conditions, whether available or not in our particular data sets. From these, minimally sufficient adjustments sets were derived, e.g. a set of variables that, when controlled for, minimizes bias from confounding without introducing further bias, for example due to over-adjustment (“opening of backdoor paths”) (Shrier & Platt, 2008; Textor et al., 2016). We also compared our full DAGs with DAGs that only included variables available to us, to assess the potential impact of unmeasured confounding. A limitation of DAGs is their inability to model interactions or reciprocal associations, such as mental health influencing the likelihood of exposure, which in turn influences subsequent mental health. This issue was partly addressed by plotting temporal sequencing across several time points (Suzuki et al., 2020).

Once minimally sufficient adjustment set were identified, confounding was handled through restriction (via inclusion and exclusion criteria), and, primarily, through covariate adjustment (Papers II and IV) or propensity score

matching (Paper III). Nevertheless, several limitations remain. Many confounders were measured crudely, often dichotomized or categorized, and most often assessed at a single time point, despite likely varying over time. This may have resulted in residual confounding.

Since there is a social gradient in mental health conditions (Linder et al., 2020; Lorant et al., 2003) and workplace bullying might be more prevalent among unskilled workers (Niedhammer et al., 2023; Ortega et al., 2009), possibly because individuals in lower socioeconomic positions have fewer resources to protect themselves, we adjusted all analyses for socioeconomic status. Socioeconomic status was, however, operationalized differently across papers. Papers II and IV used educational attainment, an indicator of socioeconomic status that can be assumed to be relatively stable in our middle-aged working population. Paper III instead used the Swedish Socioeconomic Classification (SEI, developed by Statistics Sweden), which captures current occupational and social position, and thus may be more directly related to work environment exposures, but potentially also more sensitive to health selection. Compared to educational attainment, SEI is also more likely to be related to current working conditions, including job demands that often differ systematically across occupational classes (Galobardes et al., 2006). Thus, adjusting for both SEI and job demands may have resulted in some degree of overadjustment, whereas relying solely on education could have failed to capture occupation-specific workplace characteristics.

Despite adjustment for several measured covariates, unmeasured confounding cannot be ruled out. Based on prior research, potential sources include genetic and familial factors, adverse childhood experiences, and personality traits, all of which have been linked to both workplace bullying and adult mental health outcomes (see for example Anda et al., 2007; Jacobsen et al., 2018; Kendler, 2001; Kizuki et al., 2020; Nielsen & Knardahl, 2015; Ormel et al., 2013). In Paper IV, E-value analyses suggested that any unmeasured confounder(s) would need to approximately double the risk of antidepressant use and be twice as prevalent among the exposed to fully explain away the observed association. We judge the risk of this scenario as low, particularly as the analyses focused on bullying onset, although some attenuation of the estimates is plausible.

Paper II further addressed confounding by applying fixed-effects structural equation models which control for all stable, time-invariant individual characteristics, measured or unmeasured. In addition, these analyses were adjusted for time-varying job strain. Prospective associations observed in traditional cross-lagged models were attenuated and became non-significant in fixed-effects analyses. This may suggest that these associations were at least partly driven by time-invariant confounding rather than within-person change, although other explanations could also exist to why we see attenuated associations in the fixed-effects models. While this approach reduces such bias, time-

varying confounding may still remain, resulting from factors such as job insecurity or working hours that both may change over time. However, sensitivity analysis focused on those who remained at the same workplace (which to some extent might reduce this risk) showed similar patterns. Likewise, we did not adjust the analysis for leadership quality/leadership styles, which may be associated with both the risk of workplace bullying and poor mental health (Feijó et al., 2019; Sørensen et al., 2024). This was deliberate, as we did not consider the role of the perpetrator of bullying and ratings of leadership would be risked being influenced by exposure status, if being bullied by your supervisor.

Paper III may be most vulnerable to unmeasured confounding due to less restrictive inclusion criteria and the absence of fixed-effects modelling. However, this study used propensity score matching, which allowed us to account for a broader set of covariates, model interactions, and use continuous covariates. Still, the estimated propensity scores rely solely on observed data, and residual confounding from unmeasured covariates may still have influenced the results, possibly causing us to overestimate the associations. In addition, matching balances groups at baseline only, and differential loss to follow-up could reduce comparability over time (Penning de Vries & Groenwold, 2017). Given the relatively short follow-up period of two years, this risk is considered limited.

Additional design and analytical considerations

Qualitative content analysis as a tool for measurement validity

Paper I was designed as a mixed-methods study, where quantitative data on measurement agreement, correlations, and predictive performance was complemented with qualitative data regarding experiences of personal persecution, stemming from open-ended survey responses in the second wave of SLOSH. Although these data were not originally collected to evaluate the validity of the PP-item, it provided an opportunity to more broadly examine if the experiences captured by the item corresponded to how workplace bullying is described in the literature, thereby allowing a form of content evaluation (Reichenheim & Bastos, 2021). In an ideal scenario, such an assessment would have been conducted in the development-stage of the measurement, and not, as in our case, after the measure has already been used. Nonetheless, collecting qualitative data on experiences of different forms of mistreatment has recently been proposed as a means of better understanding their unique features and differences (Dhanani & Bogart, 2026).

The abductive approach to the content analysis allowed the coding of data to be guided by the empirical material while being informed by existing workplace bullying literature. While a deductive approach departing from the key components of workplace bullying (negative behaviours, repetition, and power imbalance) would have been possible in principle, the free-text data were not structured in a way that would allow systematic coding according to these predefined components. For instance, responses seldom included information on exposure frequency, which might be due to how the prompting question was phrased. Instead, the responses primarily addressed the process of exposure, including the perceived contributing factors, experienced behaviours, and subsequent consequences. Analysing the data abductively allowed us to remain close to participants' own accounts while still drawing on existing literature on workplace bullying.

Interaction analysis

In Paper II the absence or presence of good leadership quality, was examined as an effect moderator of the bullying-anxiety relationship. Leadership quality was then operationalized by dichotomizing a continuous scale score using median split. The dichotomized approach was used to aid analyses and interpretation of interaction, but likely introduced non-differential misclassification, particularly for individuals with scores close to the median, and may have resulted in loss of information and reduced variability. In addition, ratings of leadership quality were generally high, suggesting limited contrast, which may have further attenuated potential interaction effects. Alternative categorizations, such as comparing the lowest quartile with the remainder of the distribution, were considered but could not be implemented due to limited statistical power.

Moreover, because leadership quality and bullying may be conceptually related constructs, particularly when bullying is enacted by supervisors, some degree of conceptual overlap cannot be ruled out. Such overlap can have resulted in correlated measurement error between the exposure and the moderator, potentially affecting the estimation of interaction effects (VanderWeele, 2015).

Temporal considerations

The induction time between exposure to adverse psychosocial working conditions, including workplace bullying, and mental health conditions is not known, and likely varies depending on both individual and contextual factors, as well as on the assessment of mental health conditions. Hence, deciding the optimal time lag between exposure and outcome requires consideration. In Paper II, we relied on survey data for both the exposure and the outcome, and we were therefore confined to a two-year time lag in our prospective analyses.

It is possible that different time lags would have yielded other results (de Lange et al., 2004; Dormann & Griffin, 2015; Ford et al., 2014). Moreover, in the cross-lagged panel models, we imposed equality constraints on the regression coefficients across time points, thus assuming that the association between workplace bullying and anxiety symptoms is constant over time. This decision was guided by better model fit and interpretability, however it has the downside that it does not allow for the detection of potentially escalating effects of repeated or prolonged exposure beyond what is captured through the autoregressive paths.

In contrast, Papers III and IV made use of daily register data over a two-year period, which allowed continuous follow-up, starting from the time of exposure ascertainment. Previous studies have found associations between workplace bullying and mental health conditions or sickness absence using both longer and shorter time frames (Burr et al., 2022; Einarsen & Nielsen, 2015; Liao et al., 2023). Since a longer follow-up could increase the potential for other events, potentially associated with both the exposure and the outcome, to take place (e.g. changes in job roles, staffing within the work unit, or major life events), we deemed a follow-up of two years as appropriate. Nevertheless, given that conditions such as depression and anxiety may take time to develop, and it might further take time before individuals seek help (a prerequisite for the outcomes in these studies), it is possible that longer follow-up periods could have resulted in stronger associations, albeit at the cost of a causal interpretation.

Cross-study comparability

Caution is needed when comparing estimates between the papers in this thesis, partly due to differences in study designs and analytical approaches.

In Paper II, the association between workplace bullying and anxiety symptoms is examined through structural equation modelling, with effect estimates reported as unstandardized regression coefficients (beta coefficients). These coefficients represent the mean change in anxiety symptom scores associated with exposure to workplace bullying. This differs from the other papers, which model mental health outcomes as binary variables and report relative effect measures, thus challenging direct comparisons. While methodological approaches have been proposed to convert cross-lagged effects into relative effect measures, such translations would rely on additional assumptions (Dormann et al., 2018). Even when studies use the same type of effect estimate, such comparisons should be interpreted with care. Papers III and IV both report hazard ratios but rely on different indicators of mental health conditions as outcomes (i.e. sickness absence due to depressive and anxiety disorders and psychotropic medication use). While hazard ratios reflect relative risks over time, the baseline risk of each outcome may differ substantially. As a result, hazard ratios of similar magnitude do not necessarily correspond to

effects of comparable strength in absolute terms (Sormani & Bruzzi, 2017). Estimates based on absolute risks or predicted probabilities over a defined follow-up period could have facilitated more direct comparisons across papers; however, this approach was not incorporated in the present studies.

Heterogeneity in meta-analysis

In Papers II and IV, we used fixed-effects meta-analysis to pool country-specific estimates. A fixed-effects model was used due to the inclusion of only two data sets (Bender et al., 2018). However, this approach assumes a common underlying effect across studies, with observed differences attributed solely to sampling error (Dettori et al., 2022). While the underlying populations and data structures were highly similar in SLOSH and WEHD, exposure measures differed between cohorts, which could introduce some heterogeneity. The I^2 statistic can be used to assess heterogeneity and was applied in Paper II, but as its use has been criticized, especially in cases of few studies (Rücker et al., 2008), it was not reported in Paper IV.

External validity and generalizability

The selection processes described above suggest that the analytical samples are likely older, healthier, less likely to have a poor working environment, and generally more stably employed than the general working populations in Sweden and Denmark. Consequently, external validity is influenced by selective participation, as well as by the broader contexts in which the data were collected.

The data collection was conducted in Sweden and Denmark, two neighbouring countries characterized by strong welfare and healthcare systems, extensive labour market regulations, and legal frameworks placing responsibility on employers to prevent and manage workplace bullying. Although the stigma surrounding workplace bullying may be lower here than in other countries (Nielsen et al., 2010), Sweden and Denmark report comparatively low rates of workplace bullying compared to other European countries (Danish Working Environment Authority, 2019; Swedish Work Environment Authority, 2022b). Together, these factors could limit the direct transferability of the findings to other country contexts. At the same time, it may be argued that the consistency of findings across two national contexts strengthens external validity. Moreover, observing associations in countries with relatively strong preventive regulations of workers' health may suggest that the observed relationships could be even more pronounced in contexts lacking such protection (Lunau et al., 2020).

The results may also be less generalizable to groups underrepresented in the samples, such as younger workers and foreign-born individuals. Notably,

foreign-born workers are known to be at higher risk of exposure to workplace bullying (Rosander & Blomberg, 2021). However, that we observe associations in this relatively healthy and socioeconomically stable working population may suggest that vulnerable groups in the labour market would be equally, or even more, affected, although further research is needed to draw firm conclusions.

The timing of data collection further warrant consideration. Parts of the data were collected during the COVID-19 pandemic, which may have resulted in a lower prevalence of workplace bullying (Bollestad et al., 2022; Olsson et al., 2025). Yet, none of the included studies are based solely on pandemic data and whether the pandemic modified any association between workplace bullying and mental health conditions remains unknown. Previous research has yielded inconclusive findings regarding changes in associations between psychosocial working conditions (conceptualized as job demands and resources) and mental health during this period (Ström et al., 2025).

Finally, if we assume the mechanisms explaining the association between workplace bullying and mental health conditions to be general, the findings of this thesis may be applicable across different occupational and social contexts, even if the exact magnitude of associations may differ.

Discussion

Mental health conditions represent a major public health challenge, with a substantial proportion of the burden occurring among individuals of working age (GBD 2019 Mental Disorders Collaborators, 2022). The aetiology of mental health conditions is complex and multifactorial, yet increasing evidence has suggested that psychosocial work environments can play an important role in shaping mental health outcomes (Rugulies et al., 2023). Workplace bullying, characterized by systematic devaluation of the targeted individual, stands out as a potentially severe stressor within the occupational setting, and has been linked to mental ill-health, however, high-quality empirical evidence remains limited (Mikkelsen et al., 2021). This thesis contributes more quality evidence on this topic. It set out to examine whether exposure to workplace bullying is associated with an increased risk of mental health conditions in the general working population. The aim was pursued through three objectives: i) evaluate the theoretical and psychometric properties of the PP-item, a measure of workplace bullying used in this thesis; ii) assess concurrent, prospective, and reverse relationships between workplace bullying and mental health conditions; and iii) consider the role of other psychosocial working conditions for these associations.

Regarding the first objective, Paper I supported the validity of this item for measuring workplace bullying. Both qualitative and quantitative analyses showed that it captured key features of workplace bullying, though it may also reflect less persistent forms of negative workplace interactions. The PP-item demonstrated moderate agreement with established bullying measures, comparable in magnitude to the overlap observed between those measures themselves, and its associations with later symptoms of depression and anxiety indicated predictive validity. Overall, these findings support the use of the PP-item as a measure of workplace bullying, particularly when considering the frequency and persistence of exposure, and also justify its application throughout Papers II–IV.

Regarding the second and third objectives, the results from Papers I–IV consistently indicated that individuals who are exposed to workplace bullying show an increased risk of concurrent or subsequent mental health conditions, while the evidence for a reverse relationship, whereby pre-existing anxiety or depression would increase the risk of later bullying exposure, was weaker or

absent when tested. Consistent with the lack of evidence for a reverse relationship, the associations between exposure to bullying and subsequent mental health conditions remained largely unchanged when individuals with prior mental health conditions were excluded. This indicates that the observed relationship is not driven solely by those already at risk, or, in other words, that workplace bullying may constitute a risk factor for mental health conditions also among individuals without pre-existing mental health problems.

Moreover, the most frequently exposed individuals showed the highest risk of mental health conditions, including a greater likelihood of sick leave due to depression or anxiety disorders and an increased likelihood of initiating psychotropic treatment, indicative of depressive and anxiety disorders. The associations between workplace bullying and mental health conditions were largely independent of other psychosocial working conditions, such as job demands and decision authority, and did not seem to be modified by leadership quality (assessed in Paper II only).

At the same time, some findings call for a cautious interpretation. The associations were generally modest and, although hard to directly compare, differed in magnitude depending on the choice of outcome and method. The associations appeared stronger for outcomes specifically related to depression, such as self-reported depressive symptoms (Paper I) and antidepressant treatment (Paper IV). In contrast, associations with outcomes reflecting both depression and anxiety, such as all types of psychotropic medication (Paper IV) or sickness absence due to either disorder (Paper III), were smaller and coupled with greater uncertainty. However, regarding sickness absence, the somewhat stronger association observed in the full sample compared to the propensity-score matched sample reinforces our confidence in this finding. Moreover, analyses considering intra-individual changes (Paper II) suggested that anxiety symptoms increased when individuals became exposed to bullying but this increase was not observed when considering a longer time lag. This could indicate that part of the association between workplace bullying and mental health conditions may reflect short-term emotional reactions rather than long-term disorder development, or that long-term associations might partly be explained through time-stable factors, not considered in our data. The latter was corroborated by sensitivity analyses in Paper IV using E-values, suggesting that unmeasured factors, such as genetics or stable personality traits, could potentially account for part of the observed associations.

Despite these reservations, the consistent associations of workplace bullying and mental health conditions observed across Papers II-IV, which remained robust to rigorous confounder adjustment and were seen across different subgroups and national contexts, strengthen our confidence in the overall pattern. Therefore, the conclusion of this thesis is that exposure to workplace bullying constitutes an occupational risk factor for mental health conditions. In the following section, the main findings from this thesis are situated in relation to previous empirical and theoretical literature, with an emphasis on the

synthesized results. A more detailed examination of study-specific results can be found in the respective manuscripts. The chapter ends by discussing the implications of the findings from this thesis and outlining directions for future research.

Assessment and conceptualization of workplace bullying in SLOSH

Before we can begin to examine mental health outcomes of workplace bullying, we need to know that the instruments we use to examine exposure measure what was intended. In other words, we need valid instruments to draw valid conclusions. In Paper I, we found that the PP-item, included in SLOSH questionnaires since 2006, demonstrated adequate concurrent, predictive, and discriminant validity and, to a large extent, captured the phenomena of workplace bullying as described in previous literature, thus further supporting its overall content validity. In addition, Paper I contributed to a deeper understanding into the types of behaviours that may constitute workplace bullying in our sample. The qualitative analysis indicated that these behaviours were predominantly psychological in nature, including social exclusion, harm to personal reputation, and interference with work performance, consistent with established typologies of workplace bullying (Leymann, 1996; Einarsen & Raknes, 1997). According to the Stress as Offense to Self-theory, such relational devaluations can function as potent stressors by undermining individuals' sense of being valued, respected, and treated fairly (Semmer et al., 2007). Discriminatory acts, including sexist or racist behaviours, were also observed, and some of the reported behaviours resembled incivility or conflicts, indicating potential overlap with related constructs, which has also been pointed out by previous researchers (Dhanani & Bogart, 2026; Hershcovis, 2011; Walsh & Magley, 2014). This suggests that the PP-item might to some extent also capture less persistent forms of workplace mistreatment than bullying. Therefore, considering distinct features of workplace bullying (such as exposure frequency or duration) when using the PP-item may be of importance.

Complementing behavioural inventories such as the NAQ-R with measures that assess workplace bullying through self-labelling has been proposed to capture both exposure to negative acts and the individual's interpretation of these acts as bullying (Einarsen et al., 2009; Rosander & Blomberg, 2019). This approach may give a more nuanced description of the experienced situation, and potentially weigh up for biases associated with each measurement form. However, for practical reasons, this is not always feasible. Our results suggest that the PP-item may be a pragmatic compromise of such a hybrid approach, suitable in large-scale surveys where measurement length and re-

spondent burden are often key constraints. However, while requiring the respondent to reflect on concrete behavioural experiences (in the PP-item by referring to “in the form of unkind words of behaviours”) might reduce the influence of individual perceptions to some extent, also such questions capture the work environment as filtered through the lens of the individual. While there are potential limitations with such appraisal, it can also be argued that appraisal is in itself a part of the construct of workplace bullying, as many definitions emphasize the individual’s sense of defencelessness as well as the experience of being singled out (D’Cruz & Noronha, 2019; Einarsen et al., 2011).

Workplace bullying and mental health conditions: concurrent, prospective, and reverse associations

The relatively consistent associations observed in this thesis between workplace bullying and mental health conditions align with a substantial body of prior studies. For example, exposure to workplace bullying has been associated with later depressive- and anxiety disorders (Conway et al., 2025; Mikkelsen et al., 2021), with the use of psychotropic medication (Conway et al., 2025; Niedhammer et al., 2011) as well as with both concurrent and subsequent self-reported depression and anxiety (Nielsen & Einarsen, 2012; Nielsen et al., 2015; Verkuil et al., 2015). Moreover, a meta-analysis published shortly after Paper III showed that exposure to workplace bullying was associated with an increased risk of sickness absence, including sickness absences related to mental health conditions (Liao et al., 2023).

In general, our effect estimates were of similar magnitude as to previous literature. For example, our analyses of antidepressant medication use yielded risk estimates (HR 1.6) similar to those reported by Conway et al. (2025). Moreover, our effect estimates for sickness absence due to depressive- or anxiety disorders (HR 1.3) closely matched the pooled estimate from the two prior studies using the same outcome (Liao et al., 2023). Direct comparisons of the effect estimates from Paper II (self-reported anxiety symptoms) are harder, since we did not present any standardized beta coefficients, neither are we aware of any studies that have applied intra-individual approaches to assess the association of workplace bullying and anxiety. Notably, our effect estimates in Paper III and IV were smaller than those seen in the review by Mikkelsen et al. (2021) on exposure to workplace bullying and depressive disorders (which estimated a pooled OR of 2.58). The stronger associations observed in their meta-analysis may partly reflect the use of validated diagnostic assessments that may capture a broader range of depressive cases, whereas our register-based indicators likely identify only more severe or treatment-seeking individuals, or individuals who also meet the threshold for work incapacity.

Moreover, the review focused solely on depressive disorders as the outcome. The Mikkelsen review suggested that, compared to other working conditions, exposure to workplace bullying was relatively strongly associated with depressive disorders. However, the effect sizes reported in Papers III and IV are more in line with those typically observed between working conditions, such as job strain and effort-reward imbalance, and mental disorders or mental health-related sickness absence (Duchaine et al., 2020; Rugulies et al., 2023).

While confirming results from prior studies is in itself a valuable task for science (Vachon et al., 2021), this thesis also contributes with novel knowledge by showing that, although the association between workplace bullying and mental health conditions may be partly influenced by reverse causation or unmeasured confounding from other factors, it is unlikely that these factors fully explain the relationship. Theoretically, the association between the psychosocial work environment and health has been proposed to be bidirectional, including in the case of workplace bullying (Branch et al., 2013; Siegrist & Li, 2024). Qualitative findings from Paper I also showed that some individuals partly attributed their exposure to bullying to factors such as illness or leave requirements, which could indicate potential reverse pathways. Paper II provided mixed evidence, while some results indicated a bidirectional association between bullying and anxiety, others did not. Further, Paper III found no support for a bidirectional association between bullying and sickness absence, and Paper IV showed that the association between bullying and antidepressant use was not driven by individuals with prior (clinical or subclinical) mental health conditions.

Taken together, these findings suggest that exposure to workplace bullying can in itself act as a sufficient stressor to trigger depression and anxiety, independently of prior mental health status. This does not imply that pre-existing conditions are irrelevant, rather, that they do not fully account for the observed associations. This challenges the view put forward by Mikkelsen et al. (2021) among others, that reverse causality hinders causal interpretations. These findings also align with the original framework of the psychosocial work environment by Rugulies, which posits a primary causal pathway from poor working conditions to health.

At the same time, some of our results suggest that part of the association between workplace bullying and mental health conditions may be influenced by time-stable factors. These could include individual vulnerabilities beyond prior mental health, such as stable personality traits, genetic predispositions, or childhood experiences (e.g., childhood bullying), as well as time-stable characteristics related to the work environment or other working conditions (e.g. employment forms), although evidence for the latter as risk factors for workplace bullying remains limited. Paper II examined the potential influence of such factors on self-reported anxiety, showing that prospective associations were no longer significant when by design adjusting for time-stable confound-

ing. These results align with another Swedish study, which, by the use of sibling-design, suggested that familial factors (i.e. genetics and shared early environment) might partly explain the associations between exposure to offensive behaviours at work and later risk of mental health-related sickness absence (Wijkander et al., 2024). In Paper IV, we excluded individuals already exposed to bullying or using psychotropic medication at baseline and still found an association between bullying and antidepressant medication. If stable traits or predispositions were the primary drivers of the association, significant associations at follow-up would be unlikely, since these factors are largely invariant over time. The persistence of significant associations therefore supports the interpretation that workplace bullying itself contributes to the development of mental health conditions, although residual confounding from other slowly changing factors, or factors occurring in the two years in between exposure assessments, such as major life events, cannot be fully ruled out.

Comparison of different outcomes

The pattern of our results suggested that workplace bullying may be more strongly associated with depression than with anxiety. For example, in Paper I, bullying exposure was more strongly associated with self-reported depression than anxiety, when assessed approximately one year after exposure. Additional sensitivity analyses (data not shown) indicated that this pattern was found for all measurement approaches (PP-item, SL-def, NAQ-R). Paper III only considered a combined outcome measure (sickness absence due to depressive or anxiety disorders) and found small associations, associated with some uncertainty, however we did not stratify the results by type of diagnosis. As discussed previously, this outcome likely reflects not only the presence of a diagnosed mental disorder but also contextual factors, which may partly explain the smaller observed association. Paper IV further showed that onset of workplace bullying was associated with initiating antidepressant treatment, indicative of depressive disorders, while the results regarding the association between onset of bullying and any type of psychotropic treatment were more uncertain, at least in the fully adjusted models.

As previously mentioned, differences in baseline prevalence make direct comparisons of effect sizes between outcomes challenging and does not allow firm conclusions regarding the relative strength of these associations (Sormani & Bruzzi, 2017). Moreover, differences between the outcomes used in different papers might to some extent also reflect different study designs, including differences in the time lag between exposure and outcomes. However, also previous works have indicated that the link between workplace bullying and subsequent depression may be stronger than the link between workplace bullying and subsequent anxiety (Verkuil et al., 2015). Yet, a recent Danish study

using linked questionnaire and register data found associations of similar magnitude for both depressive- and anxiety disorders (Conway et al., 2025). From a theoretical perspective, the stronger link observed with depression could reflect a process where exposure to bullying, through social-evaluative threats and relational devaluation, undermines self-esteem and evokes shame and helplessness, processes thought to be particularly relevant for the development of depression (Gerhardt et al., 2021; Semmer, 2020).

Frequency of workplace bullying

When considering exposure frequency, our findings suggest that individuals exposed to workplace bullying on at least monthly basis showed the highest risk of having subsequent mental health conditions. Previous studies on workplace bullying and psychotropic medication, albeit using self-reported outcomes, have shown mixed findings regarding dose-response associations (Niedhammer et al., 2011; Vartia, 2001) and we are not aware of studies that have analysed dose-response associations in relation to mental health-related sickness absence.

For both mental health-related sickness absence (Paper III) and psychotropic or antidepressant medication use (Paper IV) the point estimates for those reporting occasional exposure did not reach statistical significance, although they indicated a tendency towards increased risk, as did the test of linear trend. These findings may however imply that the association between workplace bullying and mental health conditions is primarily driven by those experiencing frequent exposure.

Workplace bullying in the broader psychosocial work environment

The psychosocial work environment comprises several factors that may co-exist, but also potentially affect each other, as well as jointly influence worker's mental health, with interactions that can either increase or reduce their overall influence on mental health (Bakker & Demerouti, 2014; Karasek, 1979; Siegrist & Li, 2024).

In Papers II–IV, we adjusted the analyses for job demands and decision authority, either independently or modelled as job strain, since these factors have been associated with both an increased risk of exposure to workplace bullying and an increased risk of mental health conditions. Consistent with prior research, individuals reporting exposure to workplace bullying in our samples also reported higher job demands and lower decision authority. Importantly, however, adjustment for these psychosocial work environment factors did not substantially alter the observed associations between workplace

bullying and mental health conditions, suggesting that these factors do not confound the relationship. However, this does not rule out the possibility that they may moderate it, i.e., that the strength of the association could differ depending on workers' levels of job demands or decision authority. While this hypothesis would theoretically fit the job-demands resources model, it has seldom been empirically examined (Farley et al., 2023).

In Paper II, we included leadership quality as a potential moderator of the association between exposure to workplace bullying and anxiety symptoms. This was theoretically motivated by the fact that good leadership quality could serve as a resource for the individual, increasing their coping capabilities when encountering bullying and thereby reducing its influence on mental health conditions (Cohen & Wills, 1985). Our results did not support any interaction effect. It is difficult to determine whether this reflects a true absence of moderation or is influenced by methodological limitations discussed previously. Previous research has reported mixed findings regarding the buffering potential of leadership on outcomes of workplace bullying (Farley et al., 2016). Potentially, leadership quality could be of greater importance for mitigating outcomes that, while health-related, are also closely tied to the occupational situation of the target, such as sickness absence or disability pension. In line with this, a previous study found that the association between workplace bullying and disability pension was moderated by leadership support (Clausen et al., 2019).

Importantly, in our data, exposed individuals reported lower levels of good leadership quality. While not examined in our paper, previous research suggests that leadership quality may be more important for preventing the occurrence of workplace bullying than for mitigating its mental health consequences (Feijó et al., 2019).

Does workplace bullying cause mental health conditions?

One goal of this thesis was to understand if workplace bullying causally contributes to mental health conditions. Within a counterfactual framework, this corresponds to asking whether the risk of mental health conditions would have been lower in the absence of exposure to workplace bullying (Igelström et al., 2022). For employers and policymakers, evidence of a causal link can support the implementation of preventive interventions, inform occupational health strategies, and help prioritize resources. It is also relevant for determining workers' rights to compensation. For the individual employee, recognizing that poor mental health may stem from a poor work environment could poten-

tially help reduce self-blame and shame, common responses to workplace bullying and frequently occurring symptoms in depressive episodes (Glaso & Notelaers, 2012; Glaso et al., 2011; Vie et al., 2012; Zahn et al., 2015). Importantly, given that the occurrence of workplace bullying appears to be largely shaped by organizational factors, this perspective does not shift blame onto perpetrators but emphasizes that responsibility for prevention rests with the organization.

At the same time, inferring causality from observational data is challenging. Associations may be biased from factors such as selection, confounding, and reverse causation (Hernán & Robins, 2016), and isolating the effect of a single exposure, such as workplace bullying, is further complicated by the likely interplay of multiple psychosocial working conditions and individual vulnerabilities on health (Rod et al., 2024). This thesis addressed some of these limitations by applying thorough adjustment for potential confounders, temporally separating exposure and outcome, examining onset and changes in exposure, as well as quantifying the potential influence of unmeasured factors. While these methodological improvements can serve to strengthen confidence in a link between workplace bullying and mental health conditions, causal inferences must still be drawn cautiously.

Beyond these methodological considerations, it is important to recognize that while causal modelling can help avoid logical fallacies, it is, quoting Greenland (2017), “in the end an exercise in hypothetical reasoning to aid our actual inference process, and should not be identified with the process itself” (p. 8). As such, causal modelling can inform, rather than replace, causal reasoning, which requires integrating model-based results with substantive knowledge, consideration of alternative explanations, and an assessment of how robust the observed associations are to plausible sources of bias and uncertainty (Greenland, 2017).

In epidemiology, causal reasoning has traditionally been structured using the nine Bradford-Hill considerations (strength, consistency, specificity, temporality, biological gradient or dose-response, plausibility, coherence, experiment, and analogy) (Hill, 1965). Viewed through this lens, the studies included in this thesis provide support for a potential causal link between workplace bullying and mental health conditions with respect to consistency, temporality, and dose-response. Regarding plausibility, there is theoretical support for pathways linking workplace bullying to mental health conditions (presented on page 25-27 in this thesis). Yet, other considerations remain difficult to assess. For example, while stronger associations have traditionally been viewed as providing greater support for causal inference, modest effect sizes do not preclude causality.

Of course, mental health conditions in the working population may have many different, and possibly intertwined, causes. Moreover, not everyone who is bullied at work will experience deteriorating mental health. Yet, from the

perspective of the sufficient-component cause model (Rothman, 1976), workplace bullying may act as one component among several, that together contribute to mental health conditions. While the work in this thesis largely has focused on examining the effects of causes (does workplace bullying contribute to mental health conditions?), a complementary perspective would be to examine the causes of observed effects (what causes mental health conditions in the working population?) (Schooling et al., 2016), including the potential contribution of bullying.

Implications for policy and practice

The high prevalence of mental health conditions in the working population calls for increased knowledge about their underlying causes and risk factors, particularly those that can be targeted with preventive interventions. The findings of this thesis contribute to this knowledge base by supporting workplace bullying as a contributing risk factor for mental health conditions. As such, the results from this thesis serve to demonstrate the importance of integrating occupational health into the wider public health agenda and recognizing workplace bullying as a societal concern with implications for population mental health. This perspective is particularly relevant in light of ongoing demographic changes, with an ageing workforce and increasing expectations for prolonged working lives, which amplify the potential long-term public health consequences of a poor psychosocial work environment (De Rijk & Bültmann, 2025).

The results in this thesis thus support continued and strengthened efforts to prevent workplace bullying. In the Swedish context, national legislation has progressively clarified employers' responsibility to prevent negative social behaviours at work. However, challenges remain in translating regulatory requirements into practice, particularly when it comes to victimization and bullying (Swedish Work Environment Authority, 2022a). In light of this, it is noteworthy that the Swedish Work Environment Authority has shifted its monitoring focus from bullying ("personal persecution") to the broader concept of "victimization". Although a broader monitoring focus may encourage earlier preventive action, it also risks that more severe and systematic forms of victimization receive less attention, potentially also affecting how such cases are addressed.

Beyond regulatory and policy-level initiatives, preventing workplace bullying and its health-outcomes requires action at the workplace level. In this thesis, leadership quality did not appear to buffer the association between exposure to workplace bullying and symptoms of anxiety. From a preventive perspective, these findings could indicate that the greatest potential for reducing mental health conditions following workplace bullying lies in primary prevention, meaning early interventions aimed at preventing negative behaviours

from emerging, rather than in remedial efforts after bullying has occurred. While the results from this thesis can mainly serve to conclude that such prevention is necessary, other research may help guide the format and content thereof. Although more high-quality intervention research is needed, available evidence suggests that bullying behaviours might be reduced through educational programs, cognitive rehearsal, and supervisor support training, albeit generally demonstrating small to moderate effect sizes (Gillen et al., 2017; Rodríguez-Muñoz et al., 2024). Paradoxically, while risk factors for workplace bullying primarily reside at the organizational and workplace-level (Feijó et al., 2019), there is still limited evidence of interventions that extend beyond the individual (Rodríguez-Muñoz et al., 2024).

Last but not least, that we find that workplace bullying likely contributes to poor mental health stresses the need for adequate and timely healthcare for those exposed. Healthcare providers, whether within occupational health services or the general health care system, should be aware that workplace bullying may contribute to the development of mental health conditions. Such awareness is important not only for understanding symptom onset, but also for treatment planning, as addressing the consequences of workplace bullying may require coordinated efforts between healthcare providers and workplaces.

Implications for future research

Apart from implications for policy and practice, this thesis also has implications for future research. The results from Paper I align with other research (Garthus-Niegel et al., 2016), indicating that hybrid measures of workplace bullying demonstrate good validity and capture the phenomenon similarly to standard measures, and thus are suitable for use in future studies. However, given that the PP-item might also reflect less persistent forms of negative workplace interactions, it is recommended that future studies employing the PP-item also consider the frequency criterion when determining exposure status.

Moreover, this thesis demonstrated that the use of intra-individual analytical approaches (applied in Paper II) may generate nuanced findings and improve causal inference by reducing bias from time-invariant confounding. In the field of psychosocial occupational epidemiology, the use of such methods is still relatively uncommon (Rugulies et al., 2023), and future studies could therefore benefit from applying similar analytical strategies to better understand the dynamic nature of psychosocial work exposures and mental health outcomes, preferably coupled with more closely spaced measurements.

Some of our findings also warrant further investigation. The potentially differential associations between workplace bullying and anxiety versus depression should be examined in future studies, ideally using repeated meas-

urements with shorter time lags to better capture both fluctuating and persistent symptoms. Future research could also examine how exposure to workplace bullying potentially co-exists and interacts with other workplace stressors, such as other interpersonal relationships, beyond that with the leader. Preferably, such studies could also take the source of bullying into account. Moreover, although the results were broadly consistent for men and women overall, the sex-stratified analyses in Papers II and IV showed some variation by country, which could be explored in future research.

Clearly, more knowledge is needed regarding preventive interventions for workplace bullying (Rodríguez-Muñoz et al., 2024), particularly at the policy and organizational levels. There is also a need to better understand whether current policies and interventions reach employees who are targets of workplace bullying. This could include examining who receives support, what types of support are provided, and the role that occupational health services can have in this. Such knowledge is crucial not only for strengthening primary prevention, but also for improving secondary and tertiary prevention aimed at reducing health consequences and supporting recovery.

Conclusion

This thesis examined whether exposure to workplace bullying contributes to mental health conditions in the general working population. Using population-based samples of workers in Sweden and Denmark, it found that exposure to workplace bullying was associated with several indicators of depression and anxiety, and that this association generally persisted also when accounting for individual conditions and conditions in the psychosocial work environment. The findings are strengthened by the validation of the measure used to assess workplace bullying in the Swedish sample. Moreover, the thesis presents several arguments that support a causal interpretation of the observed associations. Taken together, this thesis concludes that exposure to workplace bullying constitutes an occupational risk factor for mental health conditions. Consequently, successful prevention of workplace bullying may contribute to reducing mental health conditions in the general working population.

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Rebecka

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