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## Using Stepwise Regression Techniques to Shortlist the Number of Antecedents of Employee Absenteeism

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#### Abstract

*Purpose* – The phenomenon of employee absenteeism is one well-studied, even though, the problem is difficult to fight for organizations and difficult to study for researchers. Most researchers focus their study on only a small portion of possible antecedents while there exists a long list of possible antecedents. This study focuses on all possible antecedents and their relation with absenteeism using a large dataset to find the most important antecedents and help organizations fight, and researchers study, employee absenteeism.

*Research Design/Methodology* – With the help of the revised and extended model of employee absenteeism, all possible antecedents of absenteeism are described. Data is obtained from a large cleaning firm operating in the Netherlands over 2015. Data is made available for three regions, incorporating 4706 employees, of which 4334 remained after the deletion of missing values. With the help of stepwise regression the antecedents of absenteeism will be investigated to find those antecedents that are most important. Absenteeism is studied both by taking the number of absences during a year (frequency) and by taking the ratio between the hours an employee was absent during the year and the hours this employee has worked.

*Findings* – Five antecedents come forward in all the regressions and therefore seem to be of most importance. These five are age, gender, job demands, work group characteristics, and location and transportation problems. For the frequency and ratio of absenteeism, the sign of the relationships can differ. This important finding implicates that for both measures of absenteeism different mechanisms underlie the role the antecedent plays.

*Implications* – For organizations and researchers it is important to recognize the differences between the two measures of absenteeism. Reducing the frequency of absences can in turn result in longer absences, whereas reducing the duration of absences can result in more (but shorter) absences. Furthermore, five antecedents are most important when investigating employee absenteeism. This shortlist of absenteeism can function as a guideline for managers and policy makers when initiating possible solutions for employee absenteeism.

*Value* – The results show that absenteeism indeed is a multifaceted and complex problem. The model of employee absenteeism presents four categories of antecedents, where every category is represented by at least one antecedent in the results. The model, along with the extensive literature review, provides a perfect pathway for future research that incorporates a more complete dataset to triangulate the results across firms, industries and countries.

#### Keywords

Absenteeism - Antecedent - Stepwise Regression - Cleaning Industry

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#### **Management Summary**

The consequences of absenteeism are very clear for both organizations and researchers. The costs occurring due to absenteeism are high and seem to be increasing year by year. As a result, it will be both beneficial for firms as well as the society in general to find the most important antecedents of absenteeism. Most studies, however, focus only on a small fraction of all the possible antecedents of absenteeism. Since only a small portion of studies find no relation, focusing on only a small fraction of all possible antecedents might be too limited. This research combines all possible antecedents in one study, to find the most important ones in explaining absenteeism. The finding which antecedents are most important can be a very helpful tool for politicians and managers to define policies to tackle the problems resulting from absenteeism. Measuring and recording all possible antecedents that are most important reduces the costs and efforts involved while the results remain. Therefore, the goal of this research is to provide an overview of all possible antecedents that can play a role, and then investigating which of these are most important in relation to employee absenteeism.

In order to do this, a revised and extended model of employee absenteeism is developed, on which an extensive literature review on antecedents of absenteeism is based. With the help of these and with help of the data provided by Asito, regressions are executed with the frequencies of absences and the ratio of absent hours in relation to worked hours as the dependent variables. This led to five important antecedents; age, gender, job demands, work group characteristics and location and transportation problems. The results of age and gender are in line with expectations. For age, older employees were found to have a higher frequency of absences and a higher absenteeism ratio. For gender, women were found to have a higher absenteeism ratio and frequency than their male counterparts. For job demands and the work group characteristics, signs of the relationships between the antecedents and the two dependent variables differed. This indicates that for these antecedents a positive relation with the frequency of absences and a negative relation with ratio of absences (or in the opposite direction) is found. Therefore, solving problems concerning the frequency of absences of employees can result in elevated absence ratios, and vice versa. For location and transportation problems, the results were contrary to expectation. The expectation was that for rural areas absenteeism would be higher compared to urban areas, whereas the results show that urban areas have higher absenteeism rates than rural areas.

The above described findings prove that employee absenteeism indeed is a multifaceted and complex problem. Of the five found antecedents, three are very difficult to adjust by the employer. For age and gender, some possibilities exist in awarding part-time contracts to older (female) employees, whereas their younger (male) counterparts can get awarded permanent contracts. For location and transportation problems, selecting employees from rural areas to work in urban areas results in difficulties since this increases the distance the employees have to travel, where this distance in turn has a positive effect on the ratio of absences. Therefore, only solutions are possible within the domains of the antecedents job demands and work group characteristics. But also for these antecedents, the solutions are not so straightforward and simple as one might think. Due to the fact that the signs of the relations with the frequency of absences and the ratio of absenteeism change, solving problems concerning the frequency of absences with the job demands and work group characteristics will result in an elevated absenteeism ratio, and vice versa. Unfortunately, precise characteristics of these two antecedents are unknown and future research might prove valuable to tackle absenteeism problems in the future.

#### 1. Introduction

The phenomenon absenteeism is one well-studied, both from the perspective of the causes as well as of the consequences. Of course, there exist obvious reasons for employees being absent, however, there is a grey area of reasons for reporting sick that are less legitimate, such as not feeling like going to work, or conflicting demands between work and family. Due to this information asymmetry concerning reasons for being absent, the problem is difficult to fight for organizations and difficult to study for researchers (Ten Brummelhuis, Johns, Lyons & Ter Hoeven, 2016). However, the consequences of absenteeism are very clear for both organizations and researchers. The costs occurring due to absenteeism are high and seem to be increasing year by year. Corporations in the United States were said to lose over \$8,000 per person annually in 1998, while costs to employers in the United Kingdom in the same year were estimated to be between £353 and £381 million per year (Darr & Johns, 2008). Prater & Smith (2011) denoted that the costs of absenteeism in the USA in 2010 were \$118 billion, and Ten Brummelhuis, Johns, Lyons and Ter Hoeven (2016) argue that missed work due to employee absence is estimated to cost organizations in the U.S. about 202 billion dollars every year. The costs for the company include the basic salary of the absent employee, payments for overtime work, payment to replacement workers, and management costs (Tenhiälä, Linna, Von Bonsdorff, Pentti, Vahtera, Kivimäki & Elovainio, 2012). Statistics Canada cites that the average full-time employee lost 10.2 days for personal reasons in 2007 which has increased steadily from 7.4 days lost by each employee in 1997 (Kocakulah, Kelley, Mitchell & Ruggieri, 2016). Apart from the economic consequences of absenteeism, accompanying consequences of being absent, such as increased job responsibilities, job dissatisfaction, disrupted coworker relationships, and lower performance ratings can potentially exacerbate an employee's experience of strain upon return to work (Darr & Johns, 2008).

As a result, it will be both beneficial for firms as well as the society in general to find the most important antecedents of absenteeism. Most studies, however, focus only on a small fraction of all the possible antecedents of absenteeism. But, as can be seen later in Table 2, only a small portion of studies find no relation with absenteeism. Therefore, absenteeism seems to be a multifaceted and complex problem, that focusing on only a small fraction of all possible antecedents might be too limited. In this research, all possible antecedents will be jointly analyzed, to be able to find which antecedents

play an important role in absenteeism. The finding which antecedents are most important can be a very helpful tool for politicians and managers to define policies to tackle the problems resulting from absenteeism.

One firm particularly interested in finding these antecedents is Asito. Asito is one of the largest and most well-known cleaning companies in the Netherlands. The company, founded in 1952 in Almelo, located in the Eastern part of the Netherlands, Twente, employs around 10.000 people (Asito, 2017). Even though the company is headquartered in Almelo, operations are run nationwide. Asito, in 2015 proclaimed best cleaning company of the Netherlands by managers, achieved a revenue of  $\notin$  227 million in 2015, and their revenues expanded with 5,7 percent to  $\notin$  240 million in 2016 (Facto, 2017). However, not everything is going as crescendo at Asito. In 2016 the company faced an absenteeism rate of 7,13 percent, leaving the company with costs ranging between 7 to 8 million euros per year. This percentage is well above the national average in the cleaning industry of 6 percent (Stichting van de Arbeid, 2014) and even farther above the overall national average absenteeism of 4,3 percent (CBS, 2016). The high rates of Asito and within the cleaning industry indicate that within the cleaning industry there exists something that causes employees to be absent more often.

In general, a very high frequency of cleaners report poor health and musculoskeletal symptoms, as well as very low levels of joie de vivre compared to other employees (Søgaard, Blangsted, Herod & Finsen, 2006). The main goals of cleaning are to maintain functionality, appearance, and appropriate hygienic conditions of buildings and public places outdoors (Zock, 2005). Therefore, cleaners work in buildings that are generally planned for other workers and not designed with cleaning in mind where issues such as access, the location of taps and storage facilities are important (Health and Safety Executive, 2003). Cleaning work is demanding and labor intensive, and involves high cardiorespiratory and musculoskeletal loads (Zock, 2005). Many cleaning tasks have to be carried out under time constraints, involve heavy manual work, and are often carried out in awkward postures for long periods, which might lead to long-term damage (Health and Safety Executive, 2003). Physical hazards depend on current design of buildings, facilities, and furniture, as well as cleaning tools, machines, and methods (Zock, 2005).

Common tasks in cleaning are mopping, dusting, vacuuming, polishing floors and work surfaces, sterilizing equipment, and routine housekeeping (Charles, Loomis & Demissie, 2009). These activities can be physically demanding and numerous investigations have shown that cleaners are at risk of developing work-related musculoskeletal disorders (MSDs) of the back, neck, shoulders, elbows, hands and lower limbs as a result of their work (European Agency for Safety and Health at Work, 2008). Furthermore, in occupations with a high work pace and/or low skill discretion, such as cleaning, the risk of mental health problems is substantial (Gamperiene, Nygård, Sandanger, Wærsted & Bruusgaard, 2006).

Numerous investigations have shown that cleaners are at risk of developing work-related MSDs, impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves and the localized blood circulation system, as a result of their work (European Agency for Safety and Health at Work, 2008). And often these MSDs result from the effects of many repeated, apparently moderate loads that are endured over an extended period and that may not appear to cause immediate injury but if imposed regularly over many months or years can cause deterioration of these bodily structures (European Agency for Safety and Health at Work, 2008). In several countries MSDs cause more work absenteeism or disability than any other group of diseases and are highly prevalent in manual-intensive occupations, such as cleaning (Punnett & Wegman, 2004). MSDs can obviously result in an increase in sickness absence and an increase in accident and injury reports, but also in low motivation and dissatisfaction among cleaners and an unwillingness to perform a specific task or tasks (Health and Safety Executive, 2003). As a consequence, the relation between cleaning tasks and MSDs have been studied frequently, all with similar findings; cleaning tasks (can) result in MSDs (Woods & Buckle, 2005; Rossignol, Leclerc, Allaert, Rozenberg, Valat, Avouac, Coste, Litvak & Hilliquin, 2005; Zock, 2005; Unge, Ohlsson, Nordander, Hansson, Skerfving & Balogh, 2007; Kumar & Kumar, 2008).

Many cleaning tasks are performed after or before regular working hours, fear and risk of harassment and violence is not uncommon, particularly among women. Also related to their working hours, cleaners are often excluded from social contacts such as coffee breaks. In general, cleaners have little or no chance to influence their work, to advance in their professional career, and little or no possibility to influence their work arrangements, work place, tools or machines, the division of labor, or choice of work partner. As a result, work related stress and lack of control over work conditions is common and other factors affecting mental health are physical strain, fatigue, time pressure, insufficient training, and monotonous work (Zock, 2005). Similar occupational factors that impede mental health are found by Sales and Santana (2003); low qualified jobs, low salaries, lack of occupational training, and low level of job control, all common among cleaners and housemaids. Psychosocial stressors at work have been found to be related to musculoskeletal problems, among others, as well as a high work pace. Poor intellectual discretion, especially monotony on the job, was related to a feeling of poor health in general and to several indicators of (ill-) health behavior as well (Houtman, Bongers, Smulders & Kompier, 1994).

As a result, reducing absenteeism is extremely hard for companies operating in the cleaning branch, and tackling the problem by changing work tasks, the work environment and/or the social context might be a unrealistic (short-term) goal, especially for a firm operating nationwide and employing around 10.000 people. To be able to reduce the absenteeism, Asito has introduced several initiatives and programs, such as the National Integration Dinner and 'Taalmaatje', focusing on inclusivity of their diverse workforce. In addition, they now work on a solution for reducing absenteeism amongst the older employees. The reasoning behind targeting this particular group from Asito perspective is just as simple as straightforward, their absenteeism rates are the highest within the company (see Table 1 and Figure 1) and other solutions are very hard to implement. The elderly employees are less mobile, and retraining trajectories are not or less supported by them. Table 1 indicates that the elder employees are absent most at Asito. However, all age categories are above the nationwide average (Volksgezondheidenzorg, 2017), indicating a problematic situation for the company. First of all from an economic perspective, frequently absent employees have been shown to demonstrate poorer job performance, are likely to be

Age	Short	Middle long	Long	Total
< 20	0,22%	0,50%	0,36%	1,07%
20-29	0,50%	0,91%	2,14%	3,55%
30-39	0,50%	1,30%	4,48%	6,27%
40-49	0,47%	1,30%	5,59%	7,35%
50-59	0,49%	1,61%	6,42%	8,52%
60-69	0,44%	1,98%	7,93%	10,35%
>= 70	0,10%	4,15%	10,40%	14,65%
Total	0,47%	1,38%	5,28%	7,13%

Table 1. Absenteeism per age and duration and the total over 2016.

Note: the green boxes indicate by Asito accepted rates of absenteeism, the red boxes indicate rates that need attention and are considered too high. Source: Asito.



Figure 1. Absenteeism (in %) per age (in years) and the corresponding trend.

Note: The first entry is the average calculated for all ages (also those above 65), the dotted line represents the trend. Source: Asito.

absent in the future, and have a greater tendency to leave the organization (Duff, Podolsky, Biron & Chan, 2014). Further, older employees, on average, had longer tenure, believed their co-workers were absent to a greater degree, and were absent more often than were employees with shorter tenure (Gellatly, 1995).

Also, from a more social perspective, the company Asito is characterized by a diverse and dissimilar workforce, employing over 100 nationalities. Their workforce, that inherently and definitely creates most of the value to the organization, can also propose a reason for this difficulty. Since dissimilar employees care less about the group, are less likely to behave in accordance with their group mates and are more likely to engage in both organizational and interpersonal deviance behaviors at work (Gellatly & Allen, 2012). Furthermore, staff that does not belong to the ethnic population has a greater risk of mental health problems. Gamperiene, Nygård, Sandanger, Wærsted and Bruusgaard (2006) showed with a study on migration that the stress of adaptation and settlement, as well as language barriers, may negatively affect a person's mental health.

Looking at the characteristics of the older employees, other social factors also play an important role. Asito employed in 2016 768 employees aged 61 or older. This group is particularly at risk developing MSDs but also in developing health problems. Research pointed at the development of mental health problems among women showed that women aged 50–59 years had a higher risk of mental health problems than other age groups whereas the group 60+ also scored higher than the younger women (Gamperiene, Nygård, Sandanger, Wærsted & Bruusgaard, 2006).

Furthermore, the Dutch government decided in 2012 that the age of retirement will be incrementally increased to the age of 67. This also can have serious financial and physical consequences for (older) employees. When the age of retirement is moved to an older age, questions regarding health and welfare arise quickly. Seven out of ten elder employees in the research by NIDI (Nederlands Interdisciplinair Demografisch Instituut) has at least one long-term illness, condition or disability identified by a doctor. A quarter even has three or more diseases. Over forty percent is impaired by health complaints to a small (35 percent) or high (9 percent) degree in work tasks. A majority of the lower educated experience their work as physically heavy whereas a majority of the higher educated experiences stress. A third of the lower educated indicated that they experience their work to be both physically demanding and stressful. This implies that working beyond the age of 60 does not go for granted (Henkens, Van Solinge, Damman & Dingemans, 2016). As a consequence of the above described working conditions, many cleaners are forced either to opt for early retirement or are, essentially, invalided out of the profession, a phenomenon with sizeable consequences both for themselves individually and for society more broadly, which must pay the healthcare and other costs associated with their work injuries (Søgaard, Blangsted, Herod & Finsen, 2006).

Therefore, as already described above, it will be beneficial to society in general to find the most important antecedents of absenteeism. First of all, it can lay a foundation for policies aiming to reduce absenteeism. Secondly, measuring and recording all possible antecedents is very costly and takes a lot of effort. A simpler model focusing on those antecedents that are most important reduces the costs and efforts involved while the results remain. Since literature covers 25 antecedents of which several consist of multiple possibilities to analyze in relation with absenteeism, creating a shortlist of antecedents that have the most effect on absenteeism might prove valuable. Researchers, governments and firms can more easily direct policies aiming to reduce absenteeism, reducing both effort and costs. Therefore, two important questions will be answered in this research. First, the question which antecedents are found to be explaining absenteeism in the literature will be answered in an extensive literature review. And second, the question which of these antecedents are of most importance in explaining absenteeism will be answered with the help of the data provided by Asito.

With the help of an extension of the *Process Model Employee Absence* by Steers and Rhodes (1978) possible antecedents of employee absenteeism will be described in the literature review. These possible antecedents will be transformed into variables, and with the help of stepwise regression method analyzed to answer the question which antecedents have the most explaining power in absenteeism. The next section will provide the literature review. The data and the regression method will be described in the third section, whereas the fourth section provides the results. The fifth section will discuss the results, implications and recommendations.

#### 2. Literature Review of the Antecedents of Absenteeism

#### 2.1 Definition of absenteeism

Existent literature on absenteeism provides several, but rather similar, definitions. Most definitions take an employee perspective and define it as being absent from a workstation (Munro, 2007), as a "habitual failure to appear, especially for work or other regular duty" (Prater & Smith, 2011, p. 1), as being "a lack of physical presence at a behavior setting when and where one is expected to be" (Harrison & Price, 2003, p. 204), or as the failure to report for scheduled work (Darr & Johns, 2008). Cascio and Boudreau (2010, p. 52) extended this latter definition further into "any failure to report for or remain at work as scheduled, regardless of reason". An exception is Kocakulah, Kelley, Mitchell and Ruggieri (2016) who take a company perspective and describe it as a root cause of losses in productivity and company performance.

Absenteeism is an important point for companies as it impacts service delivery, staff morale, and could lead to financial losses (Munro, 2007). In a common employment situation the employee has a fundamental obligation to tender his/her services to the employer, and the employer is contractually obliged to pay the employee for these services. When an employee fails to report for this scheduled work, the employer would record this absence as absenteeism (Munro, 2007). According to Darr and Johns (2008), absenteeism has been operationalized in a variety of ways in primary research and provides examples as records-based or self-report indices of attitudinal, frequency and time lost absence. Because absenteeism is low base-rate behavior, absence days are aggregated over varying time periods, for example per week, month or per year, to indicate the total amount of absenteeism or the rate of absenteeism over that particular period (Darr & Johns, 2008).

#### 2.2.1 Antecedents of absenteeism

One of the most cited contributions as regards employee absence is the *Process Model* of *Employee Absence* by Steers and Rhodes (1978) (Løkke, Eskildsen & Jensen, 2007). Steers and Rhodes suggest that an employee's attendance is a function of two important variables. First, the employee's motivation to attend, and second, the ability of the employee to attend. So, for an employee to attend he or she must be motivated to attend or have a reason to come to work and he or she must also be able to come to work.

According to the authors, the motivation to attend, in turn, is largely influenced by the satisfaction with the job situation and various internal and external pressures to attend. The decision to attend or not is according to Steers and Rhodes influenced by the employee's personal characteristics (Løkke, Eskildsen & Jensen, 2007). The personal characteristics shape the values and job expectations of the employee and influence the ability to attend. The job situation interacts with the employee values and job expectations influence the satisfaction with the job. And this satisfaction, along with the pressures to attend, shape the attendance motivation. This attendance motivation in combination with the ability to attend, decides whether the employee attends or not, the employee attendance. Furthermore, the model is of a cyclical nature, indicating that the employee attendance in turn can often influence perceptions of the job situation, pressures to attend, and attendance motivation (Steers & Rhodes, 1978).

The model (see Steers & Rhodes, 1978, p. 47) provides a decent pathway for further research, since it incorporates a wide variety of possible antecedents. Although the relatively old model received critics, see for example Brooke Jr. (1986), others have failed to propose better models. The fact that other models did not prove to be better, does not imply that the critics are unjust. Therefore, these critics are taken into account in this research. Brooke Jr. (1986) indicated possible problems with the imprecision in the specification of several antecedents as *job scope, economic/market conditions* and *work group norms*. As a result, these antecedents will be described in the most detailed manner, incorporating as much ways of possible interpretation as possible. Furthermore, it seems that the model proposes antecedents that are mutually dependent. For example, *family size* and *family responsibilities* seem to be mutually dependent, which also holds for *work group size, co-worker relations* and *work group norms*, and *job level* and *role stress*. Therefore these variables will be included as singular constructs; *responsibilities towards and conflicts within the family, work group characteristics* and *job demands*.

Moreover, Brooke Jr. (1986) argues that one area of concern relates to the omission of potentially important variables and provides with *job involvement* and *involvement with alcohol* two examples of variables that have shown to be associated with absenteeism (Brooke Jr., 1986). When conducting research on the above variables in the literature, more variables were stumbled upon that were not included in the relatively old model of Steers and Rhodes; *ethnicity, previous absence behavior, personality, contract type, job involvement, work involvement* and *involvement with* 

*debt*. In addition, Brooke and Price (1989) argued that health status was an important antecedent to be included, and this variable is the replacement of *Illness and Accidents*, due to the fact that illness and accidents affect the health status of the employee.

Further, due to the fact that automobile commuting grew rapidly between 1960 and 1980 and homes and jobs shifted to suburban locations (Novaco & Gonzalez, 2009), the role of locations on absenteeism are not included in the above model. In the current literature, location has been frequently studied in relation with absenteeism and is therefore included under *Location and Transportation Problems*. Lastly, the term *job scope* has been replaced with the term *Autonomy on the job*. All in all, these modifications lead to the revised and extended model presented in Figure 2, and represents the antecedents of absenteeism reflected in the literature.

In the first box, the job situation is presented. The job situation concerns the characteristics that determine whether the employee enjoys the work environment and the tasks that characterize his or her work. The expectation is that when one enjoys the work the employee will have a strong desire to come to work. Therefore, the job situation consists of those antecedents that characterize the nature of the job and the surrounding work environment. This category consists of the antecedents *autonomy on the job, job demands, leadership, opportunities for promotion, contract type, job* 





Note: The model shows all antecedents that can play a role in employee absenteeism. The lines indicate how several categories of antecedents can influence each other. The model is cyclical in nature, indicating that employee attendance itself affects several antecedents of absenteeism.

*involvement, work involvement* and *job satisfaction*. Steers and Rhodes (1978) argue that considerable evidence suggests that the relationship between the job situation and subsequent satisfaction and attendance motivation is not a direct one. Instead, the authors believe that the values and expectations an employee has concerning their job interacts with the job situation to shape this satisfaction with the job. The employee values and job expectations (box 2) are in turn shaped by the personal characteristics (box 3). Personal characteristics such as education, age and personality influence the degree to which an employee values and expects rewards from the job. Argued is that it is important for these values and expectations to be largely met to lead to a decline in absenteeism (Steers & Rhodes, 1978). The third box containing the personal characteristics includes in addition to *education, age* and *personality* also *tenure, gender, ethnicity* and *previous absence behavior*.

So, it is clear that satisfaction with the job situation to a large extend influences the motivation to attend (box 6). However, the motivation to attend is also influenced by the pressures to attend an employee faces. These pressures represent the second major influence on the desire to come to work and can be of economic, social or personal nature. These pressures to attend, presented in the fifth box, are *economic conditions, incentive/reward systems, work group characteristics, personal work ethic, organizational commitment* and *involvement with debt*.

Next to the values and job expectations, the personal characteristics also influence the ability to attend (box 7). Even if an employee wants to come to work and has a high motivation to attend, there are instances where attendance is not possible. In these cases, the employee has no choice or behavioral discretion, and these cases include for example when the health status does not allow the employee to go to work or when transportation problems obstruct the employee to attend work. The ability to attend is defined by *health status, involvement with alcohol, responsibilities towards and conflicts within the family* and *location and transportation problems*. The ability to attend along with the motivation to attend decide whether the employee attends or not. Employee attendance (box 8) is therefore an outcome of all possible antecedents included in the model. Furthermore, the model is of a cyclical nature, indicating that the act of attendance or absenteeism in turn influences the job situation and pressures to attend. All the antecedents from the extended and revised model of employee absenteeism will be described below along the results of other researchers who studied

the same antecedent in relation to absenteeism. Also, the antecedents can be found in table 2 along with the sign of the result of the previous studies.

#### 2.2.2 Job Situation

The job situation concerns the characteristics that determine whether the employee enjoys the work environment and the tasks that characterize his or her work. The expectation is that when one enjoys the work the employee will have a strong desire to come to work. Therefore, the job situation consists of those antecedents that characterize the nature of the job and the surrounding work environment. This category consists of the antecedents *autonomy on the job, job demands, leadership, opportunities for promotion, contract type, job involvement, work involvement* and *job satisfaction*.

#### Autonomy on the job

As described above, cleaners face monotonous repetitive work that is characterized by a poor psychosocial work environment, including few opportunities for mental stimulation, small possibilities for development, and only little social contact and support on the job, all of which can lead to boredom and stress. Cleaning is considered to be a precarious job, with low pay, lack of esteem, lack of control over working conditions, and a lack of promotional prospects (Gamperiene, Nygård, Sandanger, Wærsted & Bruusgaard, 2006). In general, cleaners have little or no chance to influence their work, to advance in their professional career, and little or no possibility to influence their work arrangements, work place, tools or machines, the division of labor, or choice of work partner. As a result, work related stress and lack of control over work conditions is common (Zock, 2005). Similar occupational factors that impede mental health are found by Sales and Santana (2003); low qualified jobs, low salaries, lack of occupational training, and low level of job control, all common among cleaners and housemaids. Poor intellectual discretion, especially monotony on the job, was related to a feeling of poor health in general and to several indicators of (ill-) health behavior as well (Houtman, Bongers, Smulders & Kompier, 1994).

Cleaning is characterized by a poor psychosocial work environment, including few opportunities for mental stimulation, small possibilities for development, and only little social contact and support on the job, all of which can lead to boredom and stress. Cleaning is considered to be a precarious job, with low pay, lack of esteem, lack of

Antecedent	Study	Result
Job Situation	¥	
Autonomy on	Sales & Santana (2003)	-
the Job	Houtman, Bongers, Smulders & Kompier (1994)	-
	Allebeck & Mastekaasa (2004)	-
Job Demands	Dwyer & Ganster (1991)	+
	Hagen & Bogaerts (2014)	+
	Bakker, Demerouti, De Boer & Schaufeli (2003)	+
	Schaufeli, Bakker & Van Rhenen (2009)	+
	Bakker, Demerouti & Verbeke (2004)	+
	Bakker, Demerouti & Schaufeli (2003)	+
	Smulders & Nijhuis (1999)	Х
	Devonish (2013)	+
	Van Woerkom, Bakker & Nishii (2016)	+
	Deery, Walsh & Zatzick (2014)	+
	Vignoli, Guglielmi, Bonfiglioli & Violante (2016)	+
	Roelen, Koopmans, De Graaf, Van Zandbergen & Groothoff	
	(2007)	+
Leadership	Clausen, Burr & Borg (2014)	-
	Hassan, Wright & Yukl (2014)	-
	Davey, Cummings, Newburn-Cook & Lo (2009)	-
	Judge & Martocchio (1995)	-
Opportunities	Davey, Cummings, Newburn-Cook & Lo (2009)	-
for Promotion		
Contract type	Benavides, Benach, Diez-Roux & Roman (2000)	-
	Vermeulen, Tamminga, Schellart, Ybema & Anema (2009)	-
	Dahlke (1996)	-
	Zaballa, Martínez, Duran, Alberti, Gimeno Ruiz de Porras &	
	Benavides (2016)	-
	Scoppa (2010)	+
	Restrepo & Salgado (2013)	+
Job	Cohen (2000)	-
Involvement	Davey, Cummings, Newburn-Cook & Lo (2009)	-
XX7 1	Wegge, Schmidt, Parkes & Van Dick (2007)	Х
Work	Class (2000)	-
Involvement	Class $(2011)$	-
JOD	Hausknecht, Hiller & Vance (2008)	+
Satisfaction	Sagre (1998) Sakavila (1006)	+
	Saksvik (1990) Cohon & Colon (2007)	+
	Davay Cummings Newburn Cook & Lo (2000)	+
Darsonal Characte	vistion	I
F ducation	Lambert Edwards, Camp & Saylor (2005)	+
Education	Sin (2002)	v
	Avery McKay Wilson & Tonidandel (2007)	x
	Mastekaasa (2000)	x
	Breslin Tompa Zhao Pole Amick III Smith & Hogg-Johnson (2008)	-
	Mastekaasa (2005)	_
	Restreno & Salgado (2013)	+
Tenure	Hassan, Wright & Yukl (2014)	+
	Barmby, Ercolani & Treble (2002)	+
	Thomson, Griffiths & Davison (2000)	x
	Ng & Feldman (2013)	X

Table 2. Literature Review of the Model of Employee Absenteeism.

	Gellatly (1995)	+
Age	Hackett (1990)	+
	Barmby, Ercolani & Treble (2002)	+
	Scoppa (2010)	+
Gender	Roelen, Koopmans & Groothoff (2009)	+
	Avdic & Johansson (2003)	-
	VandenHeuvel & Wooden (1995)	-
	Hassan, Wright & Yukl (2014)	-
	Kim, Sorhaindo & Garman (2006)	-
	Barmby, Ercolani & Treble (2002)	-
	Casini, Godin, Clays & Kittel (2013)	-
	Scoppa (2010)	-
	Campbell & Mínquez-Vera (2007)	-
	Mastekaasa (2014)	-
Ethnicity	Henry & Evans (2007)	-
	Härtel & Fujimoto (2000)	-
	Jansen, Otten & Van der Zee (2015)	-
	Gilbert & Ivancevich (2001)	-
	Avery, McKay, Wilson & Tonidandel (2007)	-
Personality	Judge, Martocchio & Thoresen (1997)	+
	Furnham & Miller (1997)	+
	Salgado (1997)	Х
	Furnham, Fore & Ferrari (1999)	+
	Conte & Jacobs (2003)	+
	Störmer & Fahr (2013)	+
	Bolton, Becker & Barber (2010)	+
Previous	Ivancevich (1985)	+
Absence	Cohen & Golan (2007)	+
Behavior	Davey, Cummings, Newburn-Cook & Lo (2009)	+
Pressures to Attend	l	
Economic	Allebeck & Mastekaasa (2004)	-
Conditions	Beemsterboer, Stewart, Groothoff & Nijhuis (2009)	-
	Hausknecht, Hiller & Vance (2008)	-
Incentive/	Kim & Garman (2004)	-
Reward	Briggs (1990)	-
Systems	Landau (1993)	-
	Hassink & Koning (2009)	-
	Engström & Eriksen (2002)	-
	Hirschfeld, Schmitt & Bedeain (2002)	-
	Robins & Lloyd (1984)	-
	Nauta, Blokland & Witteveen (2013)	Х
Work Group	Kivimäki, Sutinen, Elovainio, Vahtera, Räsänen, Töyry, Ferrie &	
Characteristics	Firth-Cozens (2001)	+
	Bamberger & Biron (2007)	+
	Davey, Cummings, Newburn-Cook & Lo (2009)	+
	Ten Brummelhuis, Johns, Lyons & Ter Hoeven (2016)	+
	Gellatly (1995)	+
	Gellatly & Allen (2012)	+
	Duff, Podolsky, Biron & Chan (2014)	+
Personal Work	Dyer (1992)	-
Ethic	Saksvik (1996)	-
	Saksvik & Nytrø (2001)	-
	Sanders (2004)	-
	McDonald (1993)	х
Organizational	Schalk (2011)	Х

Commitment	Kim & Garman (2003)	Х
	Cohen & Golan (2007)	Х
	Clausen, Christensen & Borg (2010)	-
	Sagie (1998)	-
	Davey, Cummings, Newburn-Cook & Lo (2009)	-
	Hausknecht, Hiller & Vance (2008)	-
	Lambert, Griffin, Hogan & Kelly (2015)	-
	Woods, Poole & Zibarras (2012)	-
	Clausen, Burr & Borg (2014)	-
	Edwards (2014)	-
Involvement	Hendrix, Spencer & Gibson (1994)	+
with Debt	Jacobson, Aldana, Goetzel, Vardell, Adams & Pietras (1996)	+
	Joo & Garman (1998)	+
	Kim & Garman (2003)	+
	Kim & Garman (2004)	+
	Joo (1998)	+
	Martines (2015)	+
Ability to Attend		
<b>Health Status</b>	Davey, Cummings, Newburn-Cook & Lo (2009)	-
	Cohen & Golan (2007)	Х
	Asplund, Marnetoft, Selander & Åkerström (2007)	-
	Beemsterboer, Stewart, Groothoff & Nijhuis (2009)	-
Responsibilities	Väänänen, Kumpulainen, Kevin, Ala-Mursula, Kouvonen,	
towards and	Kivimäki, Toivanen, Linna & Vahtera (2008)	+
Conflicts	Jansen, Kant, Van Amelsvoort, Kristensen, Swaen & Nijenhuis	
within the	(2006)	+
Family	Edwards (2014)	+
	Gignac, Kelloway & Gottlieb (1996)	+
	Goff, Mount & Jamison (1990)	+
	Boyar, Maertz & Pearson (2005)	Х
	Hammer, Bauer & Grandy (2003)	+
	Cohen & Golan (2007)	Х
	VandenHeuvel & Wooden (1995)	Х
	Allebeck & Mastekaasa (2004)	Х
Location and	VandenHeuvel & Wooden (1995)	Х
Transportation	Chaudhury & Hammer (2004)	+
Problems	Allebeck & Mastekaasa (2004)	+
	Selander, Marnetoft, Akerström & Asplund (2005)	+
	Asplund, Marnetoft, Selander & Akerström (2007)	+
	Beemsterboer, Stewart, Groothoff and Nijhuis (2009)	+
Involvement	Roche, Pidd, Berry & Harrison (2008)	+
with Alchohol	Bacharach, Bamberger & Biron (2010)	+
	Allebeck & Mastekaasa (2004)	+

Note: All sources named in the literature review along with the results of their studies; x = no sign relation, + = positive sign relation, - = negative sign relation. Important: only the sign of the relation is shown in the table, the sign does not say anything about the strength of the relation and whether authors who both found a positive relation found an even strong relation.

control over working conditions, and a lack of promotional prospects (Gamperiene, Nygård, Sandanger, Wærsted & Bruusgaard, 2006). Given these indicators showing a lack of autonomy on the job, the findings of Allebeck and Mastekaasa (2004) do not surprise. The authors found that ten out of fourteen studies clearly reported that sickness

absence declines with higher control over one's work situation. Furthermore, Nauta, Blokland and Witteveen (2013) argue that there are dozens of studies that prove that the combination of high job requirements, little autonomy and little social support literally demolish employees. Therefore, **it can be expected that when the autonomy on the job is perceived to be low, absenteeism of the concerning employee is higher.** 

#### Job Demands

Dwyer and Ganster (1991) noted that work stress causes employees to want to absent themselves from the workplace. According to Hagen and Bogaerts (2014), a high degree of work pressure combined with work-related stress causes sickness absenteeism. A study that investigated the role of job demands on absenteeism found that high job demands were related to absence duration and lacking job resources to absence frequency (Bakker, Demerouti, De Boer & Schaufeli, 2003). Schaufeli, Bakker and Van Rhenen (2009) found that an increase in job demands leads to an increase in burnout scores, where these in turn predict future absence duration. An often used and quoted model is the Job Demands-Resources (JD-R) Model. The model argues that when job demands are high, employees experience increased exhaustion and when job resources are lacking, employees experience high levels of disengagement. In jobs with both high job demands and low job resources, argued is that employees develop both exhaustion and disengagement, which represent the burnout syndrome (Demerouti, Bakker, Nachreiner & Schaufeli, 2001). The latter is known to negatively affect absenteeism (Bakker, Demerouti & Verbeke, 2004). Bakker, Demerouti and Schaufeli (2003) found that job demands were the most important predictors of absenteeism through their relationship with health problems. However, Smulders and Nijhuis (1999) found no results when trying to predict absence frequency based on job control and job demands. The researchers argue that a high level of job demands may not only be harmful for the well-being of employees but also work as a pressure to attend.

However, a bunk of literature found a positive relation between job demands and absenteeism, indicating higher absenteeism rates when job demands were also high (Devonish, 2013; Van Woerkom, Bakker & Nishii, 2016; Deery, Walsh & Zatzick, 2014; Vignoli, Guglielmi, Bonfiglioli & Violante, 2016; Roelen, Koopmans, De Graaf, Van Zandbergen & Groothoff, 2007). Therefore, **the expectation is that employees** with higher job demands will also face higher absenteeism rates.

#### Leadership

Evidence points towards significant associations between poor quality of leadership on the one hand and the risk for sickness absence on the other hand (Clausen, Burr & Borg, 2014). Ethical leadership may decrease both voluntary and involuntary absenteeism, since the positive and supportive behaviors exhibited by ethical leaders encourage subordinates to behave similarly toward their coworkers which as a result will increase satisfaction at work and the experienced stress and conflict by employees resulting in lesser avoidance of work (Hassan, Wright & Yukl, 2014). There exist a few significant results in the category of leadership on nurse absenteeism. The finding that when leaders showed consideration to employees employee absenteeism decreased, suggest that relational leadership practices of managers may reduce absenteeism (Davey, Cummings, Newburn-Cook & Lo, 2009). Another study provided evidence regarding the role of fairness orientation and supervisor attributions in the absence disciplinary process (Judge & Martocchio, 1995). Supervisors who placed a high value on fairness advocated more severe disciplinary decisions than those who valued fairness less. As a result, the expectancy is that when leadership is either ethical and/or relational, this will reflect in lower absenteeism rates.

#### **Opportunities for Promotion**

Promotional opportunities were negatively and significantly related to absenteeism (Davey, Cummings, Newburn-Cook & Lo, 2009), indicating that more promotional opportunities lead to lower absenteeism rates. Furthermore, as already described, cleaners already possess small possibilities for development and little possibility to advance in their professional career. Therefore the expectation is that for **opportunities** for promotion will have a negative relationship with absenteeism.

#### Contract type

While researching associations of various types of employment with six health indicators, the authors (Benavides, Benach, Diez-Roux & Roman, 2000) found that precarious employment was consistently and positively associated with job dissatisfaction but negatively with absenteeism and stress, as compared with full time permanent workers, and that (as a potential cause) full time workers tended to report worse health outcomes than part time workers, and that these findings were generally consistent over 15 European countries. These flexible labor market arrangements that

have emerged over the past decade, also play a role in the Netherlands. This is reflected in the absenteeism pattern, characterized by a higher annual sick leave rate for flexible workers compared to full-time employees (Vermeulen, Tamminga, Schellart, Ybema & Anema, 2009). Similar results were found comparing full-time staff with part-time staff, research indicated that less absenteeism was seen among full-time staff (Dahlke, 1996). Furthermore, in Spain, the sickness absence rate was slightly higher in temporary than in permanent workers, except for workers in the older age group (Zaballa, Martínez, Duran, Alberti, Gimeno Ruiz de Porras & Benavides, 2016).

However, these findings are hard to triangulate in other literature. The dominant and contrasting view on contract type is denoted by Scoppa (2010) who states that within several labor markets, employees are insured against earnings losses due to illness, creating a moral hazard issue for workers, who are induced to take days off, gaining a wage without providing any effort. Therefore, he expects that temporary workers, or those without a fixed-hour contract shirk less. This notion is supported by other research, as was found that workers with temporary contracts have an incentive to give more effort than do workers with permanent contracts, and uncertain employment, when compared to permanent and full-time positions, is related to less absenteeism (Restrepo & Salgado, 2013).

However, this is not the only factor that plays an important role, workers with temporary contracts are less secure in their jobs than are workers with long-term contracts (Arai & Skogman, 2005). In other words, temporary workers run a greater risk of being laid-off and therefore have stronger incentives to attend work. And at last, income of formal and informal workers can differ greatly, whereas in Colombia on average an informal employee obtains less than half the salary of a formal employee (Restrepo & Salgado, 2013).

In conclusion, the type of contract seems to be playing a role in absenteeism, however, often these consequences move in conjunction with other factors. The above results prove to be inconsistent with good underlying reasoning for both points of view. Therefore, **no hard expectation is given here on the effects of the type of contract on the absenteeism rate.** Furthermore, to retest the finding of Salgado and Restrepo (2013) that in one country income of formal and informal workers can differ greatly, an interaction is included that combines the hourly wage and the contract type to see whether there indeed exists an effect and whether this effect indeed explains

absenteeism. The expectation will be that informal employees with lower wages will be more often absent than those with higher wages.

#### Job Involvement

Job involvement is defined as the psychological identification with the present job (Brooke & Price, 1989; Kanungo, 1982). Blau and Boal (1987) argue that those employees that exhibit both high organizational commitment and high job involvement should be the most motivated, and therefore least absent, individuals, since their ties to both their job as well as the organization are tightest. Unfortunately, they do not test this hypothesis. However, Cohen (2000) found that when job involvement increased, absenteeism significantly decreased. When reviewing the current stream of literature on job involvement and absenteeism, this direct relationship of job involvement to absenteeism was not significant in two studies, however, one study showed a negative relationship of job involvement and absenteeism if job involvement and organizational commitment were both high, thereby testing Blau and Boal's hypothesis (Davey, Cummings, Newburn-Cook & Lo, 2009). In a fashion almost similar, Wegge, Schmidt, Parkes and Van Dick (2007) studied the role of job satisfaction and job involvement on absenteeism and found that the two construct alone had no explanatory power. But, when combined in an interaction term, the two constructs accounted for significant additional variation in both absence frequency and time lost. Given the above results the expectation is that employees with high job involvement will be less often absent.

#### Work Involvement

Work involvement, according to Kanungo (1982), concerns the centrality of work in one's life and is a belief about the value of work in one's life, and therefore more a function of one's past cultural conditioning or socialization, or in other words how much the job can satisfy present needs (Davey, Cummings, Newburn-Cook & Lo, 2009). Even though job involvement and work involvement might be thought of as pretty similar constructs, this is not the case. Hallberg and Schaufeli (2006) studied the relations between job involvement, work involvement and organizational commitment and found that the three constructs were empirically distinct and, thus, reflect different aspects of work attachment.

The model by Cohen (2000) showed a strong and significant path from work involvement to turnover intentions and absenteeism, indicating that a higher work involvement decreased turnover intentions and absenteeism. Claes (2011) found something similar, with results indicating that high work involvement related to high sickness presence. To the best of my knowledge, unfortunately, these two authors are among the few who have tested this hypothesis.

Work involvement, although being empirically distinct from job involvement, does follow a similar path, with higher work involvement leading to less absenteeism and therefore in this research the expectation is that employees with high work involvement tend to be less often absent.

#### Job Satisfaction

Job satisfaction is defined as the overall degree to which individuals like their jobs (Brooke & Price, 1989). Two of the studies mentioned under *Organizational Commitment* (Hausknecht, Hiller & Vance, 2008; Cohen & Golan, 2007) have investigated an interaction between organizational commitment and job satisfaction, and found that a negative significant relationship with absenteeism exists. Furthermore, Hausknecht, Hiller and Vance (2008) found that job satisfaction was negatively and significantly related to absenteeism, indicating an increased level of job satisfaction decreases absenteeism, a result also found by Sagie (1998). Similar studies found that lower job satisfaction increased absenteeism (Saksvik, 1996; Cohen & Golan, 2007; Davey, Cummings, Newburn-Cook & Lo, 2009). The above results seem to stem from logic rhetoric, since the relation between being satisfied with one's job and being absent seems straightforward, the expectation here is also that employees that are more satisfied with their job will be absent less often.

#### 2.2.3 Personal Characteristics

Personal characteristics such as education, age and personality influence the degree to which an employee values and expects rewards from the job. Argued is that it is important for these values and expectations to be largely met to lead to a decline in absenteeism (Steers & Rhodes, 1978). The box containing the personal characteristics includes in addition to *education, age* and *personality* also *tenure, gender, ethnicity* and *previous absence behavior*.

#### Education

According to Lambert, Edwards, Camp and Saylor (2005) there were no prior theoretical or empirical indications that workers engage in absences from work at different rates based solely as a function of their educational level to base their hypothesis on. The authors describe three studies that found no significant relationship between educational level and absenteeism. However, in their own study, they found a negative relationship among federal correctional staff, indicating that those with a college degree have higher absenteeism than those who do not. Siu (2002) found in the study among nurses in Hong Kong that demographic variables including education did not affect absenteeism. Similar results were obtained by two other studies (Avery, McKay, Wilson & Tonidandel, 2007; Mastekaasa, 2000).

However, there are other results that indicate an existing pattern between education and absenteeism. According to one, education is predictive of work disability absence, indicating that workers with less education appear to be vulnerable when it comes to absenteeism (Breslin, Tompa, Zhao, Pole, Amick III, Smith & Hogg-Johnson, 2008). Mastekaasa (2005) finds a somewhat similar result, because in this research the probability of sickness absence declines with level of education. However, in a study on worker absenteeism in Colombia, Restrepo and Salgado (2013) find a result similar to Lambert, Edwards, Camp and Saylor, where people with lower levels of education are less likely to be absent. They also propose a reason for this contrasting result; in countries like Colombia, that have high rates of unemployment in the unskilled labor force, it is possible that lower levels of education lead to lower job security, resulting in lower absence rates. Given the above results, with the vast majority indicating no significant relation between education and absenteeism, **the expectation here is that this also holds true for this research and that no relationship will be found.** 

#### Tenure

The studies by Hassan, Wright and Yukl (2014) and Barmby, Ercolani and Treble (2002) found that employees with longer tenure have higher rates of sickness absence and two possible explanations include (1) a job security effect, and (2) the correlation of tenure with age (Barmby, Ercolani & Treble, 2002). However, the study by Thomson, Griffiths and Davison (2009) found no significant relationship between tenure and absence measures. Whereas in their review of previous research findings, the authors describe that there exist a widely acknowledged positive relation between

age and tenure, because of the natural dependency between them. The studies they use in their review, however, are relatively old, and the more recent studies find no significant relation. A finding replicated by a more recent study that found that tenure was unrelated to self-ratings of sickness and overall absence, and only weakly tot nonself-report measures (Ng & Feldman, 2013).

Even though, in this particular case, the managers of Asito believe that there exists a relation between age and tenure, due to the under *Health Status, Illness and Accidents* mentioned physical and psychological hazards resulting from cleaning tasks that might have a detrimental effect. As described there, often MSDs result from the effects of many repeated, apparently moderate loads that are endured over an extended period and that may not appear to cause immediate injury but if imposed regularly over many months or years can cause deterioration of these bodily structures. As a result, the managers believe similar results will be obtained from this study as Gellatly (1995) found. In this study older employees, that on average had longer tenure, were absent more often than were employees with shorter tenure.

Due to the believed natural dependency with age, the physical and psychological hazards resulting from cleaning tasks over an extended period, the positive results found by several of the above studies, and the experience and expectancies of the manager of Asito, the expected result for this variable is that of a positive relationship, indicating that those employees with longer tenure will be absent more often than those with shorter tenure.

Furthermore, the European Agency for Safety and Health at Work (2008) describes that numerous investigations have shown that cleaners are at risk of developing work-related MSDs and impairments of bodily structures as a result of their work and that often these result from the effects of many repeated, apparently moderate loads that are endured over an extended period and that may cause deterioration of these bodily structures if these are imposed over many months or years. As a result, one would expect these complaints to be more extant with employees with longer tenure compared to counterparts with shorter tenure. Therefore, the expectation is that employees with longer tenure that have cleaning functions have higher absenteeism rates than employees with longer tenure having office functions and younger employees employed in one of the above two functions. Therefore, an interaction is included that measures the effects of both the tenure of employees with a longer tenure and a cleaning in, with the expectation that employees with a longer tenure and a cleaning compared tenure and a cleaning compared tenure and a cleaning compared to be the expectation that employees and the function they are employed in one of the above two functions.

function will be more often absent than those with similar tenure but that are employed in office functions.

#### Age

Hackett (1990) already described in 1990 potential effects of age stereotypes within the literature, being that older workers were thought to be less productive than younger workers and many also believed that older workers were absent more often than their younger counterparts because of age-related infirmities and above-average rates of illness, especially due to age-related factors such as illness, accidents and family responsibilities. However, the relation between age, tenure and absenteeism does not seem to be so straightforward. The meta-analysis by Hackett (1990) found that age is negatively associated with avoidable absenteeism, but is positively associated with absence frequency. Similar findings result from another study. According to Thomson, Griffiths and Davison (2000), age has usually shown a positive relationship with absence duration, however, a negative relationship exist with absence frequency. However, more recent theory paints a more complex picture than the simple but rather widespread belief amongst managers that absence levels for older workers are greater than for younger workers.

Tenhiälä, Linna, Von Bonsdorff, Pentti, Vahtera, Kivimäki and Elovainio (2012) use the person-environment fit perspective to explain this. According to this perspective aging employees are likely to withdraw from unsatisfactory work conditions because they discover that these conditions are poor fits. According to these researchers (Tenhiälä et al, 2012) older employees are generally more satisfied with their work and more attached to their social environment. Studies have shown that affective and continuance commitment tends to be higher in older than younger employees and in employees with longer, rather than shorter, organizational tenure (Gellatly, 1995). Here, affective commitment refers to the employees' emotional attachment to, identification with, and involvement in the organization and continuance commitment refers to a general awareness of the costs associated with leaving the organization and is affected by anything that influences these costs (Allen & Meyer, 1990).

However, one important point here remains uncaptured. Research in the psychological and physical trajectories of aging argues that whereas younger adults typically enjoy a trajectory of growth in resources, older adults face an increasing number of losses in resources due to the prevalence of frailty and forms of psychological mortality (Baltes & Smith, 2003). As older employees experience more decline in their cognitive and physical resources, they have been found to require more job control than younger employees in order to cope with workplace stress resulting from job demands (Tenhiälä et al, 2012). Nevertheless, as already mentioned, cleaning is characterized by monotony and low job control and therefore the possibility to exert this job control in the cleaning branch by aging workers might be negligible or even non-existent. This could be a possible explanation for the findings of Barmby, Ercolani and Treble (2002) and Scoppa (2010), who found that absence rates rise monotonically with age.

Given the above results, the monotony and low job control and the prior knowledge that within Asito older employees have the highest absenteeism rates, the expectation is that for age a positive relationship with absenteeism exists. With the same underlying theoretical reasoning as the interaction term under *tenure*, an interaction term is included that measures the effects of age rather than tenure, in conjunction with the function the employee is employed in, with the expectation that older employees in cleaning functions will be more often absent than those in office functions.

#### Gender

Roelen, Koopmans and Groothoff (2009) found that low job esteem was associated with more frequent absences in men, whereas dissatisfaction with income was associated with more absence episodes among women. However, others describe that health-related absenteeism has been persistently higher for women than for men in most developed countries over the last decades (Avdic & Johansson, 2003). VandenHeuvel and Wooden (1995) describe that women tend to earn less, hold lower-status jobs and in turn, have less job flexibility, less job satisfaction and more absenteeism. Hassan, Wright and Yukl (2014) and Kim, Sorhaindo and Garman (2006) found that female employees had more absences than their male counterparts. And results of a research in 9 European economies found that male workers take sickness absence less frequently than females, and that mean difference between the genders was 1.2 percentage points (Barmby, Ercolani & Treble, 2002). Similar findings are presented by Casini, Godin, Clays and Kittel (2013) and Scoppa (2010), who claim that in Belgium and Italy, as in the rest of the Western labor market, women present absenteeism rates that are higher

compared with men. Another suggestion made is that women increase the costs of the firm as a result of higher turnover and absenteeism (Campbell & Mínguez-Vera, 2007). Finally, a large number of studies from the literature review of Mastekaasa (2014) have shown that women have considerably higher absence rates than men, and one possible explanation is that for men age connotes stability and socialization at work and therefore leads to a decrease in absenteeism and for women their household load and responsibility increases with age and does not decrease until retirement age which results in elevated absence rates (Restrepo & Salgado, 2013).

Given the similarity in the results and the fact that within the Netherlands females are also more often absent (Volksgezondheidenzorg, 2017) the expectation is that there will be a positive relationship between being female and absenteeism, indicating that females are more often absent than males. To test whether the proposition of Restrepo and Salgado (2013) holds, an interaction term between age and gender is included, with the expectation that older woman will be more often absent than their male counterparts.

#### Ethnicity

Henry and Evans (2007) denote that increases in labor turnover and absenteeism are a disadvantage of having a diverse workforce. According to these authors, an increase in workforce diversity increases labor turnover and absenteeism in organizations. A negative perception of dissimilarity is promoted by the natural inclination of people to be attracted to others with similar backgrounds, such as race, culture and past experiences. Hence, organizations where diversity is high may have high turnover and absenteeism (Härtel & Fujimoto, 2000).

Others used inclusion as a predictor of absenteeism and argued that higher levels of inclusion would be negatively related to absence (Jansen, Otten & Van der Zee, 2015). Still, the basic rhetoric behind this stems from the idea that ethnical diversity, considered without the idea of inclusion, has a negative impact on absenteeism. Their findings confirm their hypothesis, indicating that perceived inclusion was negatively related to absenteeism. Similar rhetoric is used by Gilbert and Ivancevich (2001), who suggest that diversity management will result in greater benefit in terms of reduced absenteeism. Furthermore, a meta-analysis examining racial and ethnic differences in measures of job performance, with among these absenteeism, resulted in evidence of Black-White differences in overall absence estimates (Avery, McKay, Wilson & Tonidandel, 2007). Therefore, the conclusion is that absenteeism differs among ethnical background. More specifically, the expectation is that Dutch employees will be absent less often than there foreign colleagues.

#### Personality

Judge, Martocchio and Thoresen (1997) studied the relation between personality and employee absence and the results indicate that extraversion and conscientiousness display moderate relations with absence, and that prior absence mediate a substantial amount of the relationship between these personality traits and absence. The authors argue that the carefree, excitement-seeking, hedonistic nature of extroverts, and the dutiful, rule-bound, and reliable nature of conscientious employees led the former to be absent more and the latter the be absent less. Extraverts booked more periods of leave but were rated as more superior by supervisors. Younger people more than older, and extraverted more than introverted had more periods of leave (Furnham & Miller, 1997). However, these results are not confirmed by a study of Salgado (1997), in which none of the Big Five personality dimensions were found to predict absenteeism. According to Furnham, Fore and Ferrari (1999) employees high on neuroticism are more sensitive to factors likely to lead to dissatisfaction rather than those which are related to satisfaction, that might lead the worker with negative affectivity (neurotics) to express complaints and absenteeism to voice their dissatisfaction.

According to Conte and Jacobs (2003), absence is significantly, and negatively, related to conscientiousness and, positively, to extraversion and neuroticism. Störmer and Fahr (2013) argue that when reviewing the effects of the distinct personality dimensions on absenteeism within their study, they observe that neurotic male employees exhibit higher probabilities of absence incidence and a greater number of days absent, agreeable male employees have a lower probability of absence incidence but not significantly less days absent, whereas for females conscientious employees exhibit lower probabilities to be absent. No effects were found for extraversion and openness. Bolton, Becker and Barber (2010) found something similar when investigating the role of the Big Five personality traits on counterproductive work behaviors, of which absenteeism is one. The scientists found that lower agreeableness and conscientiousness predicted more reports of all counterproductive work behaviors.

Given the results of the studies above, the expectation is that for employees high on neuroticism and low on agreeableness and conscientiousness absence rates will be higher than for those who do not possess one of these personality traits.

#### Previous Absence Behavior

Ivancevich (1985) found that past absenteeism is better in explaining subsequent absenteeism than work attitudes. Similar patterns were also found by Cohen and Golan (2007) who found that there existed a strong effect of prior absenteeism on later absenteeism in their study in Israel. Prior individual absence was significantly related to absenteeism, however, group level absence was not a predictor of individual absenteeism (Davey, Cummings, Newburn-Cook & Lo, 2009). For this research therefore it is believed that a positive relationship between absenteeism and prior absenteeism exists.

#### 2.2.4 Pressures to Attend

The motivation to attend is along with the satisfaction with the job situation influenced by the pressures to attend an employee faces. These pressures represent the second major influence on the desire to come to work and can be of economic, social or personal nature. These pressures to attend are *economic conditions*, *incentive/reward systems, work group characteristics, personal work ethic, organizational commitment* and *involvement with debt*.

#### Economic Conditions

Allebeck and Mastekaasa (2004) describe two ways in which economic conditions can influence an individual's sickness absence. First, the discipline hypothesis, that describes that employees are assumed to be more cautious about being absent when unemployment is high and the outlook for finding other work is poor. Second, the selection effects, in the case where more people in poorer health may be without work when unemployment is high or confounding with other economic conditions, such as higher work pace in companies during periods of economic growth. According to the researchers, several studies support the hypothesis that sickness absence tends to be higher when unemployment is low and lower when unemployment is high. However, there is insufficient scientific evidence as regards the underlying causal mechanisms, such as whether it is a result of unemployment per se, selection or discipline (Allebeck & Mastekaasa, 2004). Beemsterboer, Stewart, Groothoff and Nijhuis (2009) found that South-Limburg had both a higher sick leave frequency as well as unemployment rate, compared to the rest of the Netherlands. And Hausknecht, Hiller and Vance (2008) found in their study that the unemployment rate in a work unit has a small but significant negative effect on absenteeism, indicating that more unemployment decreases absenteeism within the work unit. Given the similarity in the above results a negative relationship is expected, indicating that worse economic conditions will lead to lower absenteeism rates.

#### Incentive/Reward System

Distributive justice is referred to as the degree to which rewards and punishments are related to performance inputs (Brooke & Price, 1989). Kim and Garman (2004) found a significant relationship between pay satisfaction and absenteeism, indicating that those who experienced lower levels of pay satisfaction were more frequently absent from work. Briggs (1990) found that absenteeism had decreased with 27% in the sample of 130 employees after a mixed consequence procedure was introduced, consisting of both positive reinforcement for reliable attendance and punishment for attendance abuse. Landau (1993) found that after implementation of an incentive system consisting of cash awards contingent on attendance, absenteeism decreased once the incentive system was introduced. Similar results were obtained by Hassink and Koning (2009), Engström and Eriksen (2002), and Hirschfeld, Schmitt and Bedeain (2002).

Robins and Lloyd (1984) studied the effectiveness and cost of two voluntary incentive programs designed to reduce employee absenteeism. They found that absenteeism of employees who volunteered in one of the two programs was 0.7% while overall absenteeism was 2.5%, and the costs remained constant. The concerning employees preferred monetary over non-monetary incentives. However, according to Dyer (1992), participation in decision-making was more important in reducing absenteeism than incentive plans. Thus, for some employees, the satisfaction derived from monetary incentives may be marginal. In such cases, systematic recognition, praise, feedback on employee performance and the like could constitute an incentive program. Dyer (1992) also argues that more disadvantages have been voiced for rewards than for punishments, however, neither rewards nor punishments will offset

poor personnel policies, indicating that more emphasize should be placed on policies rather than on rewards/punishments.

A Dutch research focused on the effects of the abolition of waiting days in the cleaning branch. Waiting days indicate that the employee receives his or her wage even though the employee has reported itself as absent. However, when specifically specified in the contracts, an employer has the possibility to withhold the wage of the employee for the first two days after the employee has reported absent. When this abolition of waiting days has an effect on absenteeism, differences had to be found between the three conditions, where in the first condition the waiting days remain, in the second condition the waiting days are abolished and in the third condition the waiting days are abolished in combination with an intervention focused on absenteeism guidance. The researchers found no results between the three conditions in five of the six durations of absenteeism, indicating that punishments in the form of withholding wage are not effective (Nauta, Blokland & Witteveen, 2013).

The above results make it difficult to express an expectation, however, the results seem to indicate that an incentive system contingent on cash rewards for attendance might prove most successful. Therefore, the expectation is that when there exists a relationship, it is of a negative nature, indicating that when there exists a incentive system this will result in lower absenteeism.

#### Work Group Characteristics

Allebeck and Mastekaasa (2004) found an association between support from colleagues or superiors and sickness absence, but the results were often different between men and women. Kivimäki, Sutinen, Elovainio, Vahtera, Räsänen, Töyry, Ferrie and Firth-Cozens (2001) found that employees who had been bullied showed higher absence rates, but that the occurrence of bullying within an employee's department did not influence his or her absence rate. Even when taking departmental-level factors into account, permissive referent group absence norms were strongly associated with the likelihood of excessive absenteeism. Individuals who reported absence norms of 1 point above the average were nearly four times as likely to exhibit a pattern of excessive absenteeism. Moreover, the consideration of referent group norms appears to offer significant explanatory power (Bamberger & Biron, 2007).

The perceived absence norm (what individuals thought about the unit's absenteeism rate) was significantly related to absenteeism. Absence culture, from a
social-networking standpoint, is beginning to dominate the multidisciplinary world of absenteeism. This implies that absenteeism may be socially created within groups of people. From this social-exchange perspective, absenteeism can be seen to be exchanged for negative managerial behaviors. When the culture supports poor attendance, future individual attendance will align itself with cultural norms and expectations (Davey, Cummings, Newburn-Cook & Lo, 2009). Moreover, there is strong evidence that co-workers' absence behavior influences the absence rates of individual group members in such a way that an employee is more likely to be absent when co-workers are often absent. Team members thus seem to imitate each other's absence behavior (Ten Brummelhuis, Johns, Lyons & Ter Hoeven, 2016). Gellatly (1995) found that employees use social information within their work groups to guide their own absence behavior. And in their study, Gellatly and Allen (2012) found that the actual absence behavior of other group members provides an important context for individual absence decisions. Individuals spend considerable time working with their colleagues, giving them ample opportunity to witness the absence or attendance behavior in these colleagues and directly or vicariously experience how rewards and consequences tie with such behavior.

When as a result of inter-reliance between teams the absence of team members influences the work of an employee by potentially transferring work when a worker is absent, worker absence is not only visible to but negatively impacts others by increasing their workload (Duff, Podolsky, Biron & Chan, 2014). Gellatly and Allen (2012) use social information processing theory to understand the reasoning behind this. This theory proposes that an individual's interpretation of the legitimacy of behaviors within a group is based on social/informational clues provided by group members, which in this case consists of employees being absent. In groups where others are absent frequently, one might infer that such behavior is both expected and acceptable.

Above results indicate that the absenteeism rates within the work group clearly influence the absenteeism rates of employees and therefore **the expectation is that when the absenteeism rates of the group are high, those of the employee will also be higher.** Furthermore, less deducted from theory but more from talks with the managers of Asito, an interaction term is included, that combines the number of service orders per employee with the number of colleagues on a service order. Theory states that when the culture supports poor attendance, future individual attendance will align itself with cultural norms and expectations (Davey, Cummings, Newburn-Cook & Lo, 2009) and in groups where as a result of inter-reliance between teams the absence of team members influences the work of an employee by potentially transferring work when a workers is absent, worker absence is not only visible to but negatively impacts others by increasing their workload (Gellatly, 1995). When this workload is already high because the employee has several service orders, this might negatively influence his/her absence. Therefore, believed is that **employees working on only one object along with a small number of employees will be less often absent than those working on several objects with dozens of colleagues.** 

### Personal Work Ethic

According to Steers and Rhodes (1798) consist the personal work ethic of personal values about attending. These personal values are influenced by the personal characteristics and backgrounds of the employees (Dyer, 1992). Steers and Rhodes (1978) argue for example that employees with higher educational levels may value and expect greater rewards from an organization than those with less education and that older and more tenured employees often value and expect certain perquisites because of their seniority. According to Dyer (1992) are employee attitudes treated as predictors of subsequent employee behavior. The expectancy theory emphasizes that employees' behavior at work is the result of choices about whether or not to appear at the workplace and of choices about how to behave at work. Dyer (1992) did find support for the relationship between personal values that believe attending work is the right thing to do and work attendance. So, those with a strong belief in the work ethic will have a higher rate of attendance than those who do not possess this personal belief. Saksvik (1996) got similar results when studying the relationships between aspects of the concept attendance pressure and absenteeism, this study was carried out in a large public company during a major reorganization. The author found that employees with sickness absenteeism were a vulnerable group with low job satisfaction, significant health problems and low personal work ethics. Saksvik and Nytrø (2001) found that nurses with low personal work ethics have no sense of responsibility towards their work and have the tendency to be absent from work without valid reasons. From a similar study, results from multi-level analyses showed an expected negative relationship between cohesiveness within a team and short-term absenteeism of employees. The more cohesive the team, the stronger the relationships between work ethics and short-term absenteeism (Sanders, 2004). However, McDonald (1993) found no empirical support for associations between individual-organizational value congruence and organizational citizenship and absence, indicating that when the values of the employee are aligned to those of the organization, absence numbers did not decline compared to a situation in which these are not aligned.

Given the overall consistency within the results, the expectation is that there exist a negative relationship between personal work ethics and absenteeism, indicating that **positive personal work ethics lead to lower absenteeism rates**.

#### Organizational Commitment

Organizational commitment is defined as the agreement on the part of the employees with the goals and objectives of an organization and a willingness to work towards those goals (Steers & Rhodes, 1978). Schalk (2011) found no direct relation between organizational commitment and absenteeism. Kim and Garman (2003) found that organizational commitment was not significantly related to absenteeism, a finding replicated in that no commitment form was related to absenteeism (Cohen & Golan, 2007). Other results show that low levels of commitment to the workplace were associated with higher risk of sickness absence, but that high levels of commitment to the workplace were not associated with lower risk of long term sickness absence than medium levels of commitment (Clausen, Christensen & Borg, 2010). Sagie (1998) found that high organizational commitment was associated with a decreased number of voluntary absence days. Furthermore, twelve studies investigated the relationship between organizational commitment and absenteeism, with 5 out of 12 results showing a significant negative relation, indicating that the more committed one was to the organization, the less one was absent from work (Davey, Cummings, Newburn-Cook & Lo, 2009). Hausknecht, Hiller and Vance (2008) found that the negative coefficient for organizational commitment was statistically significant, indicating that higher levels of commitment were associated with lower absenteeism.

Lambert, Griffin, Hogan and Kelly (2015) split up organizational commitment in three different measures and found that continuance commitment had a nonsignificant effect on absenteeism but that moral and affective commitment did have a negative relationship with absenteeism. In a similar study, affective commitment and normative commitment were both negatively and significantly related to absence, whereas continuance commitment was positively related to absence (Woods, Poole & Zibarras, 2012). One reason for the discrepancy between these forms of commitment can be that people high on affective and normative commitment feel a greater obligation to adhere to attendance policy and support colleagues by being at work, whereas people high on continuance commitment might feel it is difficult to leave the organization, they are perhaps more likely to exhibit absenteeism as a withdrawal behavior and may see turnover as a less viable alternative (Woods, Poole & Zibarras, 2012). In the same line, one meta-analysis showed that organizational commitment was positively correlated with work attendance, another meta-analysis indicated that affective organizational commitment was negatively correlated with absence from work, whereas respondents with low affective organizational commitment had a significantly increased risk for long-term sickness absence, and on the basis of these findings it does not seem unreasonable to expect that workplaces where employees frequently experience positive affect will have less absences than other workplaces (Clausen, Burr & Borg, 2014).

Feelings related to commitment were negatively and significantly related to days absent, and according to Edwards (2014), the fact that individuals with strong ties to the organization would be less likely to miss working days is not exceedingly surprising. However, in the case of high commitment employees can choose to show up at work while being ill. Research suggested that the ability to work through illness depends on work demands, workload, and perceived job stress (Dhaini, Zúñiga, Ausserhofer, Simon, Kunz, De Geest & Schwendimann, 2016). For example, if the employee believes that his or her co-workers will not be able to compensate for their absence, they commonly work despite their illness. This presenteeism can therefore be seen as a positive phenomenon in which high committed employees still choose to attend although being sick, whereas this showing up can also have negative effects, due to the risk of poor performance due to illness, as a sign of lost productivity (Dhaini, Zúñiga, Ausserhofer, Simon, Kunz, De Geest & Schwendimann, 2016).

**Expected is that**, following the same reasoning as Edwards (2014), that the fact that individuals with strong ties to the organization would be less likely to be absent, **organizational commitment will have a negative relationship, leading to higher absenteeism rates when organizational commitment is low.** 

# Involvement with Debt

Hendrix, Spencer and Gibson (1994) found that financial stress influences life stress and emotional exhaustion which in turn affect absenteeism. Jacobson, Aldana, Goetzel, Vardell, Adams and Pietras (1996) found a more direct effect, with significant relationships between high stress and absenteeism for both genders, where female workers reported higher stress levels and absenteeism than men, where financial stress was among work and family stress the highest source of stress. Furthermore, Joo and Garman (1998) found that financial stressors and personal financial wellness are some of the important factors that explain variance in absenteeism. This finding has been replicated, since the relationship between financial stress and absenteeism was found to be positive and significant, indicating that those who were more financially stressed were more absent from work (Kim & Garman, 2003), a finding that also resulted from a study from the same authors, Kim and Garman (2004), in which they found that a significant relationship existed between financial stress and work outcomes, including absenteeism. In other words, those who experienced higher levels of financial stress were more frequently absent from work. Furthermore, monthly installment loan payments showed a statistically significant relationship with absenteeism, in which the positive relationship denotes the amount of the monthly installments and the days of absence from work. Furthermore, behavioral assessment of personal financial wellness negatively influenced absenteeism. In other words, those who behaved well financially, tended to be less absent from work (Joo, 1998). Martines (2015) argues that poor financial behavior often manifests itself as stress, which reduces employee productivity, by talking with co-workers or supervisors about their financial stress, taking longer breaks and call in sick for work to deal with their financial problems. The results of the above studies clearly indicate a positive relational pattern between involvement with debt and absenteeism, therefore the expectation is that for the employees in this research the same pattern exists, indicating that those who are involved with debt have higher absenteeism rates.

## 2.2.5 Ability to Attend

Even if an employee wants to come to work and has a high motivation to attend, there are instances where attendance is not possible. In these cases, the employee has no choice or behavioral discretion, and these cases include for example when the health status does not allow the employee to go to work or when transportation problems obstruct the employee to attend work. The ability to attend is defined by *health status*,

responsibilities towards and conflicts within the family. location and transportation problems and involvement with alcohol.

# Health Status

Health status refers to the physical and mental well-being of the employee (Brooke & Price, 1989). In a general perspective, health was significantly and negatively related to absenteeism, as well was prior health (Davey, Cummings, Newburn-Cook & Lo, 2009), however, in their study, Cohen and Golan (2007) did not find any evidence to support this statement. Even though, Asplund, Marnetoft, Selander and Åkerström (2007) found that poor somatic health was a strong determinant of sickness absence in both sexes, and that the occurrence of severe musculoskeletal pain was also associated with a five-fold increase in sick leave. Smoking and drinking, two possible sociocultural manifestations of a less healthy lifestyle, are a more accepted habit in the daily life in South Limburg compared to Utrecht (two provinces in the Netherlands), whereas residents of South Limburg also reported more health complaints than residents of Utrecht (Beemsterboer, Stewart, Groothoff & Nijhuis, 2009). Not unexpectedly, the main finding was that risk factors in the areas smoking, overweight and poor physical condition are associated with a higher risk for sick listing, however, also was found that there exist no scientific evidence that health promotion interventions at the workplace have an effect on sickness absence (Allebeck & Mastekaasa, 2004).

Zock (2005) studied the occupational hazards and (the lack of) safety regulations among cleaners. The researcher found that these hazards can result from working tasks, the cleaning equipment applied, the cleaning products used, and the environment to be cleaned. Furthermore, Zock (2005) argues that cleaners often have unfavorable working hours, and often heating and/or ventilation are turned off or are functioning at lower level during these hours. Consequently, cleaners are often exposed to cold, heat, and poor ventilation. Lastly, Zock (2005) argues that there exists a general lack of safety regulations for cleaning work, where an important factor is the fact that most buildings are typically designed for purposes other than cleaning. The results indicate that a negative health status negatively influences absenteeism, and therefore this is also expected to be the result in this research.

#### Responsibilities towards and conflicts within the family

Domestic responsibilities or having young children does not considerably predict future sickness absence, as the rate of sickness absence both among men and women was rather weakly associated with young children, and the main responsibility for domestic work did not raise the rate of subsequent sickness absence either. However, the study of Väänänen, Kumpulainen, Kevin, Ala-Mursula, Kouvonen, Kivimäki, Toivanen, Linna and Vahtera (2008) showed that negative work-family spillover was a significant predictor of sickness absence, and these rates were higher for blue-collar jobs than for white-collar jobs, probably because employees with lower occupational status may lack the required resources to cope with these types of stressors and the nature of their work is different. The proportion of employees being absent from work was substantially higher among those experiencing work-family conflict than those who did not. High levels of work-family conflict, work-home interference, and home-work interference were all associated with a higher odds of being absent, where the highest associations were found in women (Jansen, Kant, Van Amelsvoort, Kristensen, Swaen & Nijenhuis, 2006). Furthermore, females missed more days of work to care for sick family members and also missed more days of work when having dependent children, indicating that women remain more likely to act as a caregiver for ill family members than men (Edwards, 2014). For both women and men, family responsibilities interfering with work was related to absenteeism (Gignac, Kelloway & Gottlieb, 1996), a finding similar to the results of the study by Goff, Mount and Jamison (1990) who found that less family/work conflict was related to lower levels of absenteeism. However, these results were contradicted by findings of Boyar, Maertz and Pearson (2005), who found that, contrary to their expectations, work-family conflict and family-work conflict had no main effect on absenteeism. Hammer, Bauer and Grandy (2003) found that men's absence was significantly predicted by their own family-to-work conflict, as well as the wife's family-to-work conflict.

Cohen and Golan (2007) hypothesized that those with more children under eighteen would have a higher absence rate, a hypothesis that was rejected by the data. Marital status and the presence of dependent children were not found to exert any significant impact on absence rates, even after extensive experimentation with alternative variable sets this did not alter the results (VandenHeuvel & Wooden, 1995). Allebeck and Mastekaasa (2004) found that there existed no scientific evidence that marital status or children living at home were associated with sickness absence. However, they did find limited support for an effect of divorce. Allebeck and Mastekaasa (2004) point out that studies found higher absence among divorced/separated and widows/widowers than among married people, and that unmarried employees also showed higher rates than married employees. These authors also report that those employees that had experienced a divorce in the past year had substantially higher absence rates than others, whereas the estimated effects were even stronger in the case of a death of the husband or wife.

Due to the clear results above, the expectation is that the result of responsibilities towards the family and conflicts within the family on absenteeism will be negative, indicating that more responsibilities and/or conflicts will lead to higher absenteeism.

### Location and Transportation Problems

Transportation problems result from difficulties in getting to work (Steers & Rhodes, 1978), and is a variable that is not studied often. However, transportation problems are very close linked to location, place of residence and commuting time, variables that have been studied in relation to sickness absence. Commuting time exhibits no sign of being significantly associated with absence in the analysis of a pooled sample, although once the sample is disaggregated by sex a significant association is found for women but not for men (VandenHeuvel & Wooden, 1995). Another finding is that practitioners who live within the facility compound or in the village where the facility is located are more likely to be at work at some time during the day than practitioners who live elsewhere. This finding is even clearer when the results are broken down into more specific categories and when separate absence rates are reported for half days and whole days (Chaudhury & Hammer, 2004).

Allebeck and Mastekaasa (2004) argue that rural communities show higher prevalence of both sick leave and disability pension, which is usually attributed to a weaker labor market and selection of individuals with work impairments in rural communities since more active individuals would have a greater tendency to relocate. A similar result was found by Selander, Marnetoft, Åkerström and Asplund (2005), who describe that sickness absence in Stromsund, a rural community in Sweden, was much higher than in Stockholm, Sweden's capital, and that people in Stromsund reported significantly worse somatic health and more pain than people in Stockholm. The authors pose as possible explanations that the comprehensive differences in perceived health is more likely to be explained in psychosocial terms than in pure somatic, whereas another option is due to migration; young and healthy people in Stromsund move away to seek jobs, leaving an older and less healthy population behind, while the opposite holds for Stockholm. The same scientists (Asplund, Marnetoft, Selander and Åkerström) did a similar study in 2007, investigating sickness absence in three rural municipalities and comparing these with the absence in Stockholm. They found that sickness absence was more common in the rural communities compared to Stockholm, and proposed that the educational level, that was higher in Stockholm than in the rural areas, and the job-characteristics, people in the rural communities were more likely to have blue-collar jobs, indicating a higher workload that is accompanied by an increased propensity to musculoskeletal disorders, could be the underlying factors (Asplund, Marnetoft, Selander & Åkerström, 2007). This finding was replicated by Beemsterboer, Stewart, Groothoff and Nijhuis (2009) who found similar results comparing South-Limburg with Utrecht, one rural and one urban province of the Netherlands. These scientists argue that regional differences exist, and that in regions that differ in sociocultural characteristics, different determinants may play a role in the sick leave behavior.

With the above results in mind, one could expect that the distance between place of residence and the location of work can have a negative impact on one's motivation and ability to be absent. **Therefore, the expectation is that employees for which this distance is greater the absenteeism rates are higher than for those with shorter distances. Also, given the above results the expectation is that differences between rural and urban areas exist.** Furthermore, VandenHeuvel and Wooden (1995) found that women who most commute for relatively long periods of time each day have higher absence rates than men who must commute similar periods of time. To be able to retest this result, an interaction term between gender and distance traveled is included with **the expectation that women who have to travel far will be more absent than males who travel similar distances.** 

#### Involvement with Alcohol

The relationship between workers' alcohol consumption patterns and absenteeism is more substantial than previously recognized or documented. Alcohol-related absenteeism is not restricted to small numbers of chronic heavy drinkers, but also involves the much larger number of risky non-dependent drinkers who drink less frequently at risky levels (Roche, Pidd, Berry & Harrison, 2008). A finding that was merely replicated by Bacharach, Bamberger and Biron (2010), who found that the frequency of heavy episodic drinking over the previous month was positively associated with the number of days of absence recorded in the subsequent 12 month period, whereas modal consumption is not. Furthermore, perceived co-worker support was found to attenuate, and supervisory support to amplify, the link between the frequency of heavy episodic drinking and absenteeism. After their literature review, Allebeck and Mastekaasa (2004) denote that an increased risk for sick leave exist as regards smoking, overweight, and high alcohol consumption. Furthermore, smoking and drinking, two possible socio-cultural manifestations of a less healthy lifestyle, are a more accepted habit in the daily life in South Limburg compared to Utrecht (two provinces in the Netherlands), whereas residents of South Limburg also reported more health complaints than residents of Utrecht (Beemsterboer, Stewart, Groothoff & Nijhuis, 2009).

The results indicate a clear pattern, showing a risk of increased absenteeism after alcohol consumption, therefore the expectation is that involvement with alcohol will lead to elevated absenteeism rates.

Table 3 describes the antecedents from the above literature review along with the expected sign of the relation between that antecedent and employee absenteeism. Furthermore, it describes which antecedents are included in this research by specifying the name of the variable that is included and will be used during this study. For several antecedents multiple variables are included. In the next section an explanation will be given for why several antecedents could not be included. Furthermore, the operationalization of the variables included will be discussed.

## 3. Methods

Now the antecedents of employee absenteeism are known, the next step is to gather data. This data will be used to conduct the research and to answer the question which antecedents have the most explaining power in absenteeism. Both absenteeism data as well as data concerning the variables from the literature review are necessary. Below, the data collection, available data, and estimation method are described.

Antecedent	Expectation	Data Available
Job Situation		
Autonomy on the Job	-	
Job Demands	+	Function/ Service Orders
Leadership	-	
Opportunities for Promotion	-	
Contract type	Х	Contract/ Employee Group
Job Involvement	-	
Work Involvement	-	
Job Satisfaction	+	
Personal Characteristics		
Education	Х	
Tenure	+	Tenure
Age	+	Age
Gender	-	Gender
Ethnicity	-	Dutch Citizen/
		Country of Birth
Personality	+	
Pressures to Attend		
Economic Conditions	-	
Incentive/Reward Systems	-	Wage
Work Group Characteristics	+	Group Size
Personal Work Ethic	-	-
Organizational Commitment	-	
Involvement with Debt	+	
Previous Absence Behavior	+	
Ability to Attend		
Health Status	-	
Responsibilities towards and conflicts within	+	
the Family		
Location and Transportation Problems	+	Location/ Distance/ Rural vs.
-		Urban/ Region 1/ Region 2
Involvement with Alcohol	+	

Table 3. Expectations of the variables and availability of the variable in the research.

Note: The expected signs of the relationships of the variables on absenteeism; x = no sign relation, + = a positive sign relation, - = a negative sign relation. An empty cell in the column "Data available" denotes that for that particular antecedent no data was available.

## 3.1 Data Collection

The data source is Asito. The company opened up their databases to enable this research. The dataset contains data of 4706 employees over 2015. The company has divided their operations into ten regions, and three regions were selected by the company. All data was released during summer 2017. Unfortunately, not all of the antecedents of absenteeism named in the theoretical framework were available. Asito possesses a lot of information about their employees, in the form of surveys they posed with the help of a third company, specialized in this kind of research. Unfortunately however, all input from the employees has been anonymized, to be able to ensure confidentiality of the employees and their answers. The surveys contained questions on the following topics; the organization, supervisor, collaboration, working conditions, arrangements at work, the work itself, management team, information and communication at their location, opportunities for growth, information and communication within the company, and the Works Council. As a result, the following variables had to be excluded from this research; organizational commitment, job satisfaction, job involvement, work involvement, leadership, and opportunities for advancement. The antecedents would have been perfectly captured by the answers on the survey, but are now not available.

Along with the variables above, several other possible antecedents had to be excluded as well. The antecedents education, personal work ethic, responsibilities towards and conflicts within the family, health status, personality, involvement with alcohol, involvement with debt, and autonomy on the job could not be included simply because no data was available. For previous absence behavior data is available, however, for only a limited number of employees. The reason for this is that within the company Asito, the turnover rate of employees is really high. For example, their financial manager explained that they have over 9.000 employees, but that they sent out over 15.000 annual statements. Therefore, for most employees that are in the database received, no previous absence behavior is available, simply because they were not employed by Asito prior to 2016. Furthermore, labour market conditions could not be included. The reason behind this is that aggregated data over 2016 is used for the other variables included, and using the unemployment rate of 2016 would make no difference as antecedent of absenteeism of the employees. If data for more years or aggregated

over multiple months is used, this variable could play a role and should therefore be considered for inclusion. In this research unfortunately, it will not be able to play a role.

All data that was available was handed over as SAP-output, and therefore impossible to analyze directly. Most data had to be transformed to be able to be analyzed. For example, every service order occurring during 2016 was included. One service order can occur multiple times during a year, and therefore double counts can appear easily and frequently. To be able to calculate how many employees have worked on a single service order, all these double counts had to be excluded manually, a precise and time consuming practice. After inspection of the rearranged data, several employees had to be excluded from the database. For 105 employees, the SAP-output delivered did not contain any data except the employee's ID. Therefore, these employees were excluded. Furthermore, 136 employees had to be removed from the set due to missing values for either location, group size, number of service orders, or a combination of these. For an additional 131 employees, there were no hours worked, and as a result, the data did not contain an hourly wage nor an absence ratio for these employees. After deleting all employees for which missing values were included, the dataset consisted of 4334 employees.

#### 3.2 Data on Absenteeism

Absenteeism has been operationalized in a variety of ways in primary research (Darr & Johns, 2008), and include for example records-based or self-report indices of attitudinal, frequency, and time lost absence, which comprise the most commonly used individuallevel measures of absenteeism. Because absenteeism is low base-rate behavior, absence days are aggregated over varying time periods, for example per week, month or per year, to indicate the total amount of absenteeism or the rate of absenteeism over that particular period (Darr & Johns, 2008). In this study absenteeism will be looked at from two perspectives. First, from the perspective of a ratio, comparing the hours of absence in 2015 with the total hours worked in 2015. Second, from the perspective of the frequencies of absences during 2015. Ratio and frequency measures are frequently used in absenteeism research (Lambert, Edwards, Camp & Saylor, 2005). Therefore, total hours worked and the total hours an employee reported absent are collected and transformed into a ratio. Further, the number of times the employee reported absent during 2015 are collected.

## 3.3 Operational definitions of independent variables

*Job Demands*. All other studies investigating the role of job demands in relation to employee absenteeism used primary data. With the help of questionnaires researchers investigated the job demands of employees. Due to the fact that in this research secondary data is used, this antecedent is measured as a dummy variable differentiating between blue-collar and white-collar jobs. This is not an ideal situation, since it firstly implies that differences in job demands exist between blue-collar and white-collar jobs and secondly reduces the explaining power of the antecedent in the model. Furthermore, the number of service orders are counted. To the best of my knowledge, this is the first study to include the number of service orders as part of the job demands of the employee.

The function of the employees is coded as a dummy variable. There exist over 50 types of functions an employee can have, ranging from general cleaning staff, to glass washers, to object leaders and to regional managers. All functions are split up in either one of the two categories; cleaning staff and office staff. So, simply put, all functions that have something to do with the cleaning of objects (blue-collar jobs) are located under cleaning staff and have the value 1, and all functions that have something to do with driving and steering employees are located under office staff (white-collar jobs) and have the value 0. Furthermore, for every employee the number of service orders are counted. Service orders are the orders a firm does to get their company, office or location cleaned by Asito. Service orders can be daily, weekly or monthly orders on which an employee works. Hospitals, for example, get cleaned on a daily basis. But, for example, university buildings are cleaned five days a week, whereas during summer recess the buildings are not cleaned at all. And for other objects, like small offices, these are cleaned only once a week. Therefore, some employees will work on only one object during the year, whereas other employees work on another object every day.

*Work group characteristics*. Next to the number of service orders an employee worked on during 2015, also the number of employees the employee worked along with are counted. When investigating work group characteristics, others used primary data on perceived support from colleagues, group norms and absence culture. Unfortunately, the secondary dataset does not provide variables of this kind and the group size does not explain anything about the perceived support, group norms and absence culture. *Contract type.* Other studies investigated the difference in type of contract by differentiating between flexible and full-time workers. A similar distinction is made in this research, by including the type of employment as a dummy. The company has 10 different types than can be categorized into two summarizing categories, contracts with a fixed term and contracts of indefinite duration (1), and contracts that only have a limited duration (0), which includes for example contracts that are valid as long as the core lasts or as long as the replaced employee is ill. Furthermore, the employee group is coded as a dummy variable. Employee group is a group the employee belongs to in terms of job security, and includes direct personnel (all cleaners with a fixed-hour contract), indirect personnel (all other employees with a fixed-hour contract) call-up staff, holiday staff, interns, and three different types of temporary workers. When the dummy takes the value of 1, all direct and indirect employees are included, when it takes the value 0, all other groups are included.

*Tenure*. The date of employment is transformed into the value that corresponds with the tenure of the employee. This procedure is equal to procedures used in others studies investigating the role of tenure on employee absenteeism.

*Age.* The variable age is included and is calculated by transforming the date of birth into the corresponding numerical value. This procedure is equal to procedures used in others studies investigating the role of age on employee absenteeism.

*Gender*. For gender a dummy variable is added where a 1 indicates a male employee and a 0 indicates a female employee. This procedure is equal to procedures used in others studies investigating the role of gender on employee absenteeism.

*Ethnicity*. For ethnicity two dummy variables are included. The first denotes the country of birth, with a 1 indicating an employee born in the Netherlands and a 0 indicating an employee born in a foreign country. The second dummy denotes whether or not the employee is currently a Dutch citizen (1) or not (0). This procedure is equal to procedures used in others studies investigating the role of ethnicity on employee absenteeism.

*Incentive/reward Systems*. To investigate the role of financial reward on absenteeism, the hourly wage of employees is included. This variable is calculated by dividing the number of hours the employee has worked by the direct wage costs Asito have incurred. Because employees can start earning more during the year, the total of hours over 2016 per employee are taken as measure as well as the total wage costs belonging to this employee over the year, leading to a numerical value corresponding to direct wage costs

per employee over 2016 and the most precise estimation of the wage of the employee during that year. Compared to other studies, others used perceived pay satisfaction as an indicator, or investigated the introduction of an incentive program. Therefore, differences can exist in the results compared to the expectation of the antecedent.

Location and Transportation Problems. For this antecedent four variables are included. Firstly, a dummy variable representing the location of both the client of Asito and the place of residence of the employee, if both are similar the dummy takes the value of 1, if both do not correspond the value will be 0. Secondly, a dummy is introduced to indicate whether or not the place of residence of the employee is rural or urban, with a 0 denoting a rural area and a 1 indicating an urban area. Urban areas include cities belonging in the top 85 largest cities in terms of population and have more than 47.000 habitants. Why this threshold? First of all, this threshold splits up the data in more or less similar groups in terms of size. Second, the well-known cities are now classified as being urban, and the smaller towns are recognized as rural. Thirdly, a variable is introduced that measures the distance between the location of the client and the place of residence of the employee. If both are similar, the distance is 0 kilometers, however, if these are not similar the distance is denoted in kilometers. The distance is calculated with the help of a navigation tool, and measures the distance from town city center to town city center, since the actual addresses of the clients and employees are unknown. As will be described below, employees can be active on more than one service order, and therefore work at more locations. As a result, for these employees the distance is given for the location of the client on which the employee had been working most often during 2016. Fourthly, dummy variables are introduced to address the region the employees belong to. A first dummy has the value 1 for region 1, and a value of 0 for region 2 and 3, whereas the second dummy has the value of 1 for region 2, and a value of 0 for region 1 and 3. In this case, region 3 is set as a baseline region on which the other two regions will be compared. These included variables are comparable to those other researchers included when investigating the role of location and transportation problems on absenteeism. The distinction between where one works and where one lives, the distance between these places, and the distinction between rural and urban areas and between regions all are used in other studies.

### 3.4 Estimation

Most studies focus only on a small fraction of all the possible antecedents of absenteeism. But, as can be seen later in Table 2, only a small portion of studies find no relation with absenteeism. Therefore, absenteeism seems to be a much more multifaceted and complex problem, that focusing on only a small fraction of all possible antecedents might be too limited. In this research, all possible antecedents will be jointly analyzed, to be able to find which antecedents play an important role in absenteeism. The method of estimation is stepwise regression. This regression method is a process in which the statistical software automatically adds the most significant variable or removes the least significant one during each step of the process. This is done with the help of previously specified alpha-to-enter (PIN) and alpha-to-remove (POUT) values. The alpha-to-enter is the significance level set to decide whether the variable should be entered in the stepwise model. This will typically be greater than the 0.05 level often used, since it would make it too difficult for most important variables to enter. The alpha-to-remove, obviously then is the significance level set to decide whether the variable should be removed from the stepwise model, which often takes the value of 0.15 (PennState, 2017). There are three ways; standard, forward and backward stepwise regression. These methods can provide different models, this can either be due to outliers and collinearity. In case of little correlation among the variables and no outlier problems, the procedures should find similar solutions (PennState, 2017).

In standard stepwise regression, the software both adds and removes predictors and stops when all variables not in the model have p-values greater than the specified alpha-to-enter and has removed all variables with p-values that are less than or equal to the specified alpha-to-remove value. Forward stepwise regression starts with an empty model and the most significant variable is added in each step. The method stops when all variables in the model have p-values that are greater than the specified alpha-to-enter value. Backward stepwise regression starts with all predictors in the model and then removes the least significant variable in each step. The method stops when all variables in the model have p-values that are less than or equal to the specified alpha-to-remove value (Minitab, 2017). Because the three methods can find different outcomes, all three methods are used in this research. Finding similar solutions would enlarge the robustness of the results.

## 4. Results

The research is conducted with frequency and ratio as dependent variables, and the results will be described along these two variables. The descriptive statistics, correlations and variance inflation factors of all variables are shown in Table 5. When looking at the means and correlations, one can see a mean of 1.00 for contract. This variable, a dummy, therefore indicates that (almost) every employee has the value of 1 for this variable. And the interaction variable between contract and wage has a correlation of 0.99 with contract. This should not be surprising, since when the mean of a dummy is 1 and the dummy is used in any interaction, in this case wage, the interaction will be of the variable wage times 1. Therefore, these two variables will be excluded from the analyses. Furthermore, the preliminary results are characterized by problematic outcomes when all interaction variables are included. This comes as no surprise when looking at the VIF of the variables that are used for the interactions. When including all interactions in the model, the interaction between tenure and function seems to play the most important role in explaining absenteeism (t = 5.621, p < 0.001). However, when running a linear regression including all the variables that are found in the stepwise method, this variable (the interaction of tenure and function) does not appear to be significant. As a result, this interaction variable will be excluded from further analysis. When deleting this variable, a similar phenomenon happens with the interaction between age and function. The highly significant variable does not appear to be significant when the method 'enter' is utilized. Therefore, also this interaction variable, that as well has a very high VIF, will be excluded from further analyses. Exactly the same happens with the interaction between age and tenure and therefore all analyses will be performed without the above mentioned 5 variables.

The normality plots (Q-Q plots) of the dependent variables are shown in Figure 3. The initial Q-Q plots indicated two problematic features with the dependent variables. First, the plots of the data indicate that the data contains several outliers. Second, the curve of the data shows that the data is not normally distributed. To solve problems concerning outliers, these can easily be removed. However, after removing the first five obvious outliers for frequency the curve gets more linear, but again eight outliers come forward. After deletion the curve represents better normality of the data (see Figure 3.2), but it is still far from perfect. Therefore, the dependent variable frequency is transformed into the logarithm of frequency. After transformation and with

Table 4. Means, Standard Deviations, Correlations and the Variance Inflation Factor (VIF).

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	43.68	12.70	(107.98)												
2. Tenure	9.60	7.70	0.54**	(47.40)											
3. Gender	0.22	0.42	-0.09**	-0.06**	(12.09)										
4. Country	0.63	0.48	-0.06**	-0.01	-0.04*	(1.51)									
5. Citizen	0.85	0.36	0.11**	0.16**	-0.00	0.47**	(1.34)								
6. Contract	1.00	0.06	0.02	0.05**	-0.00	-0.02	0.00	(1.01)							
7. Function	0.98	0.15	-0.04**	-0.10**	0.00	-0.08**	-0.05**	-0.01	(25.51)						
8. Employee	0.96	0.19	0.22**	0.17**	-0.05**	-0.03	0.01	-0.01	-0.03*	(1.11)					
9. Location	0.32	0.47	-0.02	0.02	-0.07**	-0.10**	-0.03	0.03	0.09**	-0.01	(1.55)				
10. Rural	0.58	0.49	-0.07**	0.06*	0.15**	-0.21**	-0.06**	-0.00	-0.00	-0.03*	0.19**	(1.17)			
11. Region1	0.34	0.48	-0.01	0.05**	-0.04*	0.29**	0.16**	0.01	-0.01	0.10**	-0.04*	-0.18**	(1.39)		
12. Region2	0.28	0.45	0.07**	0.03	0.13**	-0.33**	-0.16**	0.03	0.01	-0.03*	0.01	0.17**	-0.45**	(1.65)	
13. Distance	64.78	79.42	0.01	-0.01	0.10**	0.01	-0.03	-0.03*	-0.14**	0.04*	-0.55**	0.01	-0.07**	0.08**	(1.94)
14. SO's	8.95	23.18	0.01	0.12**	0.25**	0.03*	0.03	0.01	0.03	0.03	-0.08**	0.01	0.01	0.01	0.07**
15. Groupsize	79.80	49.61	-0.04*	-0.07**	-0.12**	0.01	0.02	-0.02	0.01	-0.46**	0.10**	-0.03*	0.07**	-0.18**	-0.18**
16. Wage	12.02	12.22	0.11**	0.18**	0.07**	0.03	0.04**	0.01	-0.07**	0.05**	-0.06**	-0.02	0.10**	-0.04**	0.04**
17. Gender*Age	9.19	18.37	0.09**	0.03	0.94**	-0.07**	0.01	-0.00	-0.00	0.00	-0.73**	0.14**	-0.05**	0.14**	0.10**
18. Gender*Distance	17.60	51.02	-0.04*	-0.04**	0.65**	-0.04**	-0.03	0.00	-0.03	-0.01	-0.23**	0.09**	-0.05**	0.10**	0.44**
19. SO's*Groupsize	345.67	153.28	-0.05**	-0.05**	0.10**	0.03	-0.01	0.00	0.05**	0.03*	-0.10**	0.02	-0.00	-0.31**	0.17**
20. Age*Function	42.57	14.22	0.86**	0.42**	-0.07**	-0.10**	0.07**	0.01	0.47**	0.18**	0.03*	-0.06**	-0.02	0.07**	-0.06**
21. Tenure*Function	9.26	7.67	0.52**	0.94**	-0.05**	-0.03	0.14**	0.05**	0.19**	0.17**	0.05**	0.04*	0.05**	0.03	-0.05**
22. Contract*Wage	11.99	12.24	0.11**	0.18**	0.07**	0.03	0.04*	0.05**	-0.07**	0.05**	-0.06**	-0.02	0.10**	-0.04**	0.04**
23. Frequency	1.44	3.80	0.13**	0.15**	-0.04**	0.02	0.03*	0.02	0.02	0.07**	-0.01	0.04*	-0.02	0.00	0.06**
24. Ratio	0.52	10.90	0.02	0.32*	-0.02	0.01	0.02	0.00	0.01	0.01	-0.02	0.03	-0.02	-0.01	0.01

Table 4. Continued.

Variable	14	15	16	17	18	19	20	21	22	23	24
14. SO's	(1.44)										
15. Groupsize	-0.32**	(1.22)									
16. Wage	0.19**	-0.08**	(1.09)								
17. Gender*Age	0.26**	-0.13**	0.09**	(11.60)							
18. Gender*Distance	0.17**	-0.15**	0.05**	0.62**	(2.29)						
19. SO's*Groupsize	0.35**	0.00	0.05**	0.10**	0.14**	(1.43)					
20. Age*Function	0.03	-0.03	0.06**	0.08**	-0.04**	-0.02	(137.14)				
21. Tenure*Function	0.13**	-0.06**	0.15**	0.03	-0.05**	-0.03*	0.56**	(48.64)			
22. Contract*Wage	0.19**	-0.08**	0.99**	0.09**	0.05**	0.05**	0.06**	0.15**	(62142)		
23. Frequency	0.05**	-0.11**	0.05**	-0.02	-0.02	0.05**	0.12**	0.15**	0.05**	(1.04)	
24. Ratio	-0.01	0.01	-0.00	-0.01	-0.01	-0.02	0.02	0.03**	-0.00	0.15**	(1.01)

Note: N = 4334 listwise (two-tailed test). The VIF is given between brackets. \* = p < 0.05 \*\* = p < 0.01.

Figure 3. Q-Q plots of the dependent variables.



3.1. Initial Q-Q plots before deletion of outliers and data transformation (N=4334).



-10 -10

0-

Observed Value

0000

-2

Observed Value

0

-4

2

-8

the initial outliers included, the curve much better represents a normal distribution. Therefore, this transformed variable will be used in the analyses. Also, for the dependent variable ratio a similar process is followed. The curve best represent a normal distribution when the data is transformed and 11 outliers are deleted.

The results of all regressions for both dependent variables can be found in Table 5. Below the results of the regression with frequency as the dependent variable will be discussed. The PIN and POUT levels are 0.05 and 0.15 respectively. Since the stepwise regression, forward regression and backward regression procedures provide exactly similar results when frequency is the dependent variable they will therefore be described simultaneously. After the results with frequency as dependent variable, the results with ratio as the dependent variable will be described. All results can be found in Table 5. As can be seen in Table 5, for several variables there are sometimes no betavalues given in Table 5. In contrast to the regression method 'enter', where also non-significant variables have values denoted in the output, with stepwise regression only those variables that are included in the PIN and POUT criterion get values as output. Therefore, it can be that for several variables no output is given and empty cells exist in the table.

### 4.1 Frequency as dependent

The three methods, stepwise (S), forward (F) and backward (B) identify nine variables as key antecedents of absenteeism. The first significant variable is the group size (t = -6.821, p < 0.001). Expected was that work group characteristics that are in favor of allowing absenteeism would result in more absenteeism. Implications of this result will be discussed in the next section. The second variable is gender, the expected negative relationship indicates that females are more often absent than their male counterparts (t= -4.519, p < 0.001). The third variable is age, that is positive as expected (t = 3.044, p< 0.01). The fourth variable is rural/urban, the positive relationship (t = 3.271, p < 0.01) indicates that employees living in urban areas are more often absent than employees living in rural areas. This result is in contrast with expectations. The fifth important variable is the interaction between the number of service orders and the group size. The positive relationship (t = 3.776, p < 0.001) indicates that the more service orders the employee has worked on and the bigger the groups the employee worked in, the higher its frequency of absences. The sixth variable is the number of service orders an

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Table	5	Re	oression	results
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	Frequency	Ratio	
Variable	S, F & B	S & F	В
Job Situation			
Function			
Employee Group			
Service Orders	-0.002**		0.003*
Service Orders * Group Size	0.001***	-0.001**	-0.001***
Personal Characteristics			
Tenure	0.008**		
Age	0.007***	0.013***	0.012***
Gender	-0.281***	-0.421***	-0.436***
Gender * Age			
Country of Birth			
Dutch Citizen			
Pressures to Attend			
Group Size	-0.004***	0.005***	0.005***
Wage			
Ability to Attend			
Location			
Distance		0.002***	0.002***
Gender * Distance			
Rural vs. Urban	0.158***	0.298***	0.306***
Region 1			-0.204*
Region 2			-0.291**
Adj. R-Squared	0.061	0.040	0.043
PIŇ	0.05	0.05	0.05
POUT	0.15	0.15	0.15

Note: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10. For the dependent variable Frequency all three estimation methods (stepwise, forward and backward) find similar results and these are presented in the first column. For Ratio, the stepwise and forward estimation methods find similar results, which can be found in the second column. The results of the backward estimation method are found in the third column. An empty cell in one of the columns indicates that within the specified PIN and POUT levels, the variable was not included in the model.

employee has worked on during the year. The negative relation (t = -2.351, p < 0.05) indicates that the more service orders an employee has worked on, the lower its frequency of absences. The last variable of importance is tenure, the positive relationship indicates that those employees employed for a longer period of time in the cleaning branch are significantly more absent than their colleagues with shorter tenure (t = 2.192, p < 0.05). This is in line with the expectation that tenure has a positive relationship with absenteeism. Looking at the results, something surprising comes forward. The variables service orders and group size have negative relationships. However, when looking at the interaction term between group size and the number of service orders, a positive relation is found. So, instead of reinforcing each other, the

opposite phenomenon happens. In conjunction, the two terms have a positive relation, indicating that when an employee works on more service orders with more colleagues, its frequency of absences will rise. Therefore, it is important for Asito to make sure that their employees are not working on several large service orders. How service orders are made up within Asito is not known and also not part of this study. But it is clear that working on several large service orders negatively influences the absence frequencies of employees.

As a takeaway point for Asito however, one explanation could be that these employees lack social cohesion and have lower job embeddedness. Job embeddedness has several key aspects; (1) the extent to which people have links to other people, teams and groups, (2) the perception of their fit with their job, organization and community, and (3) what they say they would have to sacrifice if they left their job (Mitchell, Holtom, Lee, Sablynski & Erez, 2001). Employees with lower job embeddedness are found to have higher absence rates and turnover intentions (Lee, Mitchell, Sablynski, Burton & Holtom, 2004). Therefore, it seems possible that employees working on large service orders along with dozens of colleagues, and employees working on several small service orders along with a small number of colleagues, have a higher job embeddedness than those employees working along a large number of colleagues on a large number of service orders during a year.

# 4.2 Ratio as dependent

When performing the regression methods, for the stepwise and forward estimation method similar results come forward. Also, the six variables that show to have a significant relation come forward in the backward estimation method as well. The first important variable is the group size (S&F, t = 4.350, p < 0.001; B, t = 4.460, p < 0.001). The positive relation indicates that the larger the group an employee is part of, the larger its absenteeism rate. Second, the negative relation found between gender and the absenteeism rate (S&F, t = -3.297, p < 0.01; B, t = -3.247, p < 0.01) indicates that females have a higher absenteeism rate than their male colleagues, which is according to the expectation. The third important variable is the distance between where the employee lives and works, the positive relation (S&F, t = 3.221, p < 0.01; B, t = 3.535, p < 0.001) indicates that those who live further from their work have a higher absenteeism rate. The fourth important variable is age, with a positive relation (S&F, t = 3.200)

= 2.819, p < 0.01; B, t = 2.729, p < 0.01) indicating that older employees have a higher absenteeism rate than their younger counterparts. Both results are in line with expectations. The fifth variable of importance is the difference between rural and urban areas. The positive relation (S&F, t = 2.926, p < 0.01; B, t = 2.948, p < 0.01) shows that employees living in urban areas have higher absenteeism rates than employees living in rural areas, which is contrary to the expectation. The last variable that comes forward in all three methods is the interaction between the group size and the number of service orders an employee works at during a year. The negative relation found (S&F, t = -2.394, p < 0.05; B, t = -3.350, p < 0.01) indicates that those working on more service orders and along more employees have a lower absenteeism rate. Comparing this result with the result found for the dependent variable frequency, it can be seen that for frequency and ratio the sign of the relationship differs, for frequency it is positive and for ratio it is negative. These results will be discussed in the discussion that can be found in the next section.

Furthermore, with the backward estimation method three additional variables are found to be of importance. First of all, for the number of service orders a positive relation (t = 1.666, p < 0.10) is found with the absenteeism rate. The result, which is contrary to the result found with frequency as dependent variable, indicates that employees working on more service orders have a higher absenteeism rate. Furthermore, a negative relation is found both for region 1 and region 2, indicating that those two regions have significantly lower absenteeism rates than the reference region, region 3.

## 5. Discussion

#### 5.1 Job Situation and Pressures to Attend

The first variable coming forward in all estimations is group size. However, the sign of the relationship differs for both dependent variables. For frequency, the relation is negative, indicating that working along more colleagues results in a lower frequency of absences. For ratio however, this relation is positive, indicating that employees working along more colleagues have a higher absenteeism ratio. Furthermore, a similar result is found for the second variable that comes forward in all three estimation methods. For frequency, a positive relation is found between the interaction between the number of service orders an employee worked on and the number of colleagues the employee worked along and absenteeism. However, for ratio this relation is negative. So, when an employee works on more service orders along with a lot of colleagues, its frequencies of absences will be higher, however, the duration of these absences are less long compared to colleagues working on less service orders along with less colleagues.

With frequency, the number of service orders has a negative relation indicating that those working on less service orders are more often absent than those working on several service orders. Furthermore, with the backward estimation method, for service orders a positive relation is found with ratio. However, the sign is in the opposite direction as under frequency. Therefore, the more service orders an employee works on during a year the less its frequency of absences but the longer the duration of the absences.

The phenomenon described above shows that it is extremely difficult to solve problems concerning absenteeism with antecedents from the *Job Situation*. For both the service orders and the group size a negative relation is found with frequency, whereas a positive relation is found with ratio. This implies that the more service orders an employee works on, or the more colleagues it works along, the less frequent absences it faces. However, on the other side, the less frequent absences are longer in duration. And, when looking at the interaction term, the opposite happens. If an employee works on several orders with a high number of colleagues, it will be more often absent but the ratio of absences (comparing the absence hours with the worked hours) will be lower. So, to tackle absenteeism with either group sizes or the number of service orders seems impossible. When, in this particular case, Asito wants to reduce absenteeism by reducing the number of colleagues an employee works along, consequently the ratio of absenteeism will decrease, but the frequency of absences will increase. And, the opposite holds for the number of service orders. Following this result, it is important for Asito to investigate the dynamics between the size of the group and the number of service orders an employee works on.

# 5.2 Personal Characteristics

From the regression results, two variables come forward in all estimations, and therefore seem to be important in explaining absenteeism. These, age and gender, find the expected results. This is not surprising, since previous research has pointed out similar findings, being that older employees are more often absent and women are more often absent than men. Next to the results of the authors named in the literature review, several authors (Tucker & Friedman, 1998; Jacobson, Aldana, Goetzel, Vardell, Adams & Pietras, 1996; Greiner, Krause, Ragland & Fisher, 1998) also used age and gender as a control variable to ensure reliability of their results when looking for the effects of obesity, stress (factors) and/or accidents on absenteeism, indicating that these two variables are well known antecedents of absenteeism.

Furthermore, for tenure, an expected positive result was obtained for the dependent variable frequency. The positive relationship indicates that when the tenure of the employee increases, his or her absences also increase. A result also obtained by Hassan, Wright and Yukl (2014), and Barmby, Ercolani and Treble (2002). Two possible explanations are proposed. First, the job-security effect resulting from longer years of tenure, and second, the natural correlation with age. This correlation with age can also be the reason why the antecedents age comes forward in all regressions, and tenure only with the frequency of absences as the dependent variable. In stepwise regression, the computer decides based on correlations which variables to include and which not. If age and tenure have a high correlation, the computer model can include age and exclude tenure due to the relatively high correlation they have (0.54) when age is stronger correlated to the other variables in the model compared to tenure.

In contrast to the above expected results, for ethnicity no result was found. The proposed idea was that having a diverse workforce would result in a higher absenteeism rate. An idea that finds it foundation in studies by Härtel and Fujimoto (2000) and Henry and Evans (2007) who found that organizations high on diversity face higher absenteeism rates. However, no evidence was found for this statement. Because

dissimilar employees care less about the group, are less likely to behave in accordance with their group mates and are more likely to engage in both organizational and interpersonal deviance behaviors at work (Gellatly & Allen, 2012), Asito has proposed several initiatives focusing on inclusivity of their ethnically diverse employees. Of course, it is possible that for Asito there initiatives are so successful that their ethnic minorities now have similar absence rates compared to their Dutch colleagues. Jansen, Otten and Van der Zee (2015) found that diversity management results in greater benefit in terms of reduced absenteeism, and this is also a possible solution for Asito.

# 5.3 Ability to Attend

The difference in absenteeism between rural and urban areas comes forward in all regression results. Contrary to the expectation, urban areas face higher absenteeism than rural areas. Allebeck and Mastekaasa (2004) and Selander, Marnetoft, Åkerström and Asplund (2005) studied differences between rural and urban areas in Sweden. The study from 2005 by Selander, Marnetoft, Åkerström and Asplund pointed out that people in the rural community (Stromsund) reported significantly worse somatic health and more pain than people in the urban community (Stockholm), and a possible explanation given by both studies is that rural communities have a weaker labor market since more active individuals would have a greater tendency to relocate to urban communities, meaning that young and healthy people leave the rural area to seek jobs, leaving an older and less healthy population behind. A follow-up study by Selander, Marnetoft, Åkerström and Asplund from 2007 proposed that the educational level, that was higher in Stockholm than in the rural areas, and the job-characteristics, people in the rural communities were more likely to have blue-collar jobs, indicating a higher workload that is accompanied by an increased propensity to musculoskeletal disorders, could be the underlying factors.

However, the finding in this research is that urban areas face higher absenteeism than rural areas. Where can this discrepancy come from? First of all, the countries are very hard to compare. Sweden has over 9 million people living on a surface of 447.435 km<sup>2</sup> (22,1/km<sup>2</sup>) whereas the Netherlands has 17 million people living on a much smaller surface of 41.543 km<sup>2</sup> (411,3/km<sup>2</sup>), making the Netherlands a much more densely populated country. Of these 9 million people living in Sweden, over 2.2 million, about a quarter of the total population, live in the area Storstockholm, which is the area around

the capital Stockholm. These facts indicate that the definition of rural in Sweden probably differs significantly from rural in the Netherlands. Furthermore, Sweden has 15 public universities whereas the Netherlands has 14 universities. Keeping in mind that Sweden is more than 10 times the size of the Netherlands, it largely increases the likelihood for Swedish students to have to relocate. For example, the closest university to Stromsund is about one-and-a-half hour away, whereas the second closest is almost three-and-a-half hours away. In comparison, a three-and-a-half hour ride in the Netherlands would bring you from the most southern university (Maastricht) to the most northern university (Cluleå) in Sweden would take over 16 hours. These factors make a so-called *braindrain* from rural to urban areas much more likely in Sweden.

Second, the data makes a good comparison difficult. This research received data from a cleaning firm, indicating that the research was done amongst cleaners. This specific group of employees is already often characterized by low education and bluecollar jobs, and comparing cleaners from rural areas with cleaners from urban areas might therefore be less sensible. To be able to say something about the differences in absenteeism between geographical areas in terms of population density, the research should be replicated over several countries that differ in population density and taking into account employees with both blue- and white-collar jobs. Comparing one of the most densely populated countries with one of the least densely populated countries in Europe can indicate severe differences with respect to the definition of rural and urban, whereas taking only white- or blue-collar jobs into account allows for misinterpretation of the results.

For ratio also two additional variables are found, first of all the variable distance. The result that the distance between where one lives and where one works is an antecedent should not be surprising. If this commuting distance is bigger most likely commuting time is longer. Van Ommeren and Gutiérrez-i-Puigarnau (2011) found that in Germany absenteeism would be about 16 percent less if all workers would have a negligible commute. According to Lyons and Chatterjee (2008) employers acknowledged that staff with long commutes suffered fatigue, high commuting cost, lateness and absenteeism, along with several physical complaints. The backward estimation method shows that for region 3 the absenteeism ratio is significantly higher than for the other two regions. Unfortunately, the regions are made unknown for this

research so it is difficult to discuss this in terms of how these regions differ from each other and to find possible explanations for this finding. For Asito however, the three regions are known and this finding can function as a base for a possible solution to their problems concerning absenteeism.

## 5.4 Implications

The results show five antecedents of absenteeism that come forward in all regressions, and can therefore be seen as the most important in explaining absenteeism. These are age and gender, location and transportation problems, work group characteristics and the interaction term between the group size and the number of service orders, which can be seen as an interaction between job demands and work group characteristics. Given the difference in the sign of the relationships with frequency of absences and the absenteeism ratio, both should be looked at from a different perspective. Solving problems concerning frequent absent employees can result in less frequent absences but those fewer absences will then likely be of a longer duration. This is an important implication for managers in firms with high absenteeism. Furthermore, the dynamics between the group size and the changing job demands in terms of having to work on several service orders, with changing colleagues, object leaders and job tasks on the one hand, and absenteeism on the other should be investigated to provide a clearer picture of how these two interact and how these can be optimally arranged to reduce absenteeism.

When looking at the bigger picture of Figure 2, the four categories of antecedents all represent at least one antecedent in the results. For personal characteristics, the antecedents age and gender have come forward, for job situation job demands came forward, for pressures to attend the work group characteristics are of importance and for ability to attend this holds for location. This proves the reliability of the complex model and shows that absenteeism indeed is a multifaceted problem with its roots in several antecedents with different underlying reasons. This, as well, shows why solving problems concerning absenteeism is so difficult.

But, what does this imply for firms trying to tackle absenteeism problems? First of all, it is difficult to tackle absenteeism problems with changing the age and gender of the (absent) employees. These two antecedents cannot be changed in the current employees, and selecting future employees on the basis of these two antecedents might prove very difficult. Simply because staff turnover is very high, the search for new personnel is an ongoing process and only selecting young males could be very difficult. There are some possibilities in the case where older employees get awarded part-time contracts. Since research (Scoppa, 2010; Restrepo & Salgado, 2013) found that temporary workers shirk less since they have an incentive to give more effort than do workers with permanent contracts.

Also for the third antecedent, location and transportation problems, the possibilities are also limited. The distinction made between the rural and urban places of residence of the employees indicated that employees living in urban areas were more often absent than those in rural areas. So, one could argue to reduce the absences by selecting employees from outside the city. However, this would increase the distance an employee has to overcome to get to work, and the positive relation of distance with the ratio of absences implies that this solution is not a real solution to reduce absenteeism at all.

As a result, two options remain. For the antecedents job demands and work group characteristics, there are solutions possible for the firms to reduce absenteeism. However, these solutions are not so simple as one might think. This is due to the fact that the signs of the relationships with frequency and ratio are different. For the number of service orders and the number of employees the absent employee worked along, the signs of the relationship with frequency are negative. However, the sign of the relation of the interaction term between the number of service orders and the number of employees is positive. And in contrast, in relation with ratio, the signs of the relations of these two antecedents is also positive, but then the interaction terms becomes negative. To some extent, this seems logic. An employee working on a large service order that broke his leg and was absent for 3 months, will have a low frequency of absences (just one) but a very high absenteeism ratio, since his absent hours are very high and the hours worked very low. If one compares this employee with an employee working on a small service order that suffered from the flu three times during these three months, its frequency will be higher, but the absenteeism ratio much lower. Therefore, there seems to be some logic in how these two dependent variables can have changing signs. And even though this example is pretty clear, what happens in the case of a sixty year old employee, having physical complaints, probably suffering from work-related MSDs, working on large service orders along with dozens of colleagues? Unfortunately, precise characteristics of these two antecedents and how these two

antecedents interact and influence each other is unknown. Clear is, however, that these two antecedents can play an important role for Asito in lowering their absences and that additional research into this phenomenon can prove valuable in the long-term.

#### 5.5 Recommendations

Due to the fact that several antecedents had to be excluded from the estimations (see Table 3), the painted picture is not a perfect one. Further research is necessary to extend the results with more complete data files incorporating the antecedents from Figure 2. Furthermore, the data used in this research was obtained from a cleaning firm. The cleaning industry is characterized by high absenteeism rates and the specifics of the job can result in several antecedents being of more importance here than in other industries. As a result, it is necessary to triangulate the above findings in other industries, countries and settings.

That indeed more antecedents are necessary to provide more reliable results can also be seen from the low values that are obtained for the Adjusted R-Squares. Values of 0.061, 0.043 and 0.040 are far below the thresholds that are deemed appropriate. Henseler, Ringle and Sinkovics (2009) argue that as a rule of thumb, R-Squared values of 0.25 are considered weak, whereas according to Moore, Notz and Flinger values below 0.30 are considered weak effect sizes, and Doorn and Rhebergen (1998) argues that values below 0.1 are considered very weak. Furthermore, due to difficulties in measuring and transforming the data, several antecedents were included in the regressions as dummy variables. Transforming rich data into a dichotomous variable reduces the explaining power of the data. The R-Squared is measured by dividing the difference between the estimated regression line and the sample mean by the variation in the data points around their mean. For several used variables the variation in the data points around their mean is relatively low, indicating that when the difference between the estimated regression line and the sample mean is relatively high, the R-Squared will take a low value. Therefore it is advised to reduce the number of dichotomous variables in further research and to increase the number of antecedents.

Another important point to stress is the bulk of important data from the questionnaires that went lost after ensuring confidentiality and anonymity of the employees. Organizations can take several steps to ensure this data is not getting lost after anonymizing data. first of all, firms should be aware of the difference between

anonymity and confidentiality. Anonymity means that either the project does not collect identifying information of individual subjects or the project cannot link individual responses with participants' identities (Virginia Tech, 2017). Confidentiality means that the information that is collected from the research participants can only be identified by the investigator(s) or the research team (Virginia Tech, 2017), so that they are not able to share responses of individual subjects with other parties (the company itself for instance) and it can only be used in the agreed upon manner (Oakes, 2002). For Asito, in this specific case, two data sets would have to be linked to be able to investigate the role of the above topics as possible antecedents of absenteeism. Therefore, identifiers have to be used that are common in both datasets, and these can include name, address, gender, date of birth, or a specific ID number that has been assigned to all employees of the firm (Kelman, Bass & Holman, 2002). However, when ensured confidentiality, the firm doing the surveys can obtain the employee-specific identifiers, and then address confidentiality at three points during the research process: data collection, data cleaning and dissemination of the research results (Kaiser, 2009). This de-identification process can include specific steps and methods, and they may vary depending on the circumstances, but should be appropriate to protect the confidentiality of the individuals (Nelson, 2015). According to Nelson (2015), de-identification is considered successful when there is no reasonable basis to believe that the remaining information in the records can be used to identify an individual. In the proceedings of his article, Nelson describes several approaches that can be used for de-identifying, including replacing personal information with surrogates that can later be used to look up real values or recode the variables by for example using the age or age range instead of date of birth (2015). In this specific case, also randomization, shuffling, creating pseudonyms and/or encoding (for more specific information about de-identification techniques see Nelson, 2015) could have been applied to ensure confidentiality.

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