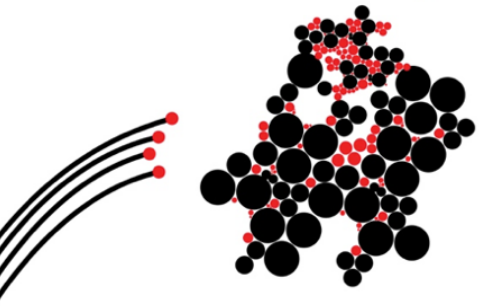

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Predicting teacher turnover in Dutch primary schools

Lisanne Foss | S2284375

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Faculty of Behavioural, Management and Social Sciences

First Supervisor: Dr.ir. Jan de Leede

Second supervisor: Prof. Dr. Tanya Bondarouk

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I hope that researchers and practitioner will be inspired to build further on this work to ensure quality in primary education for the future generation.

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Abstract

Problem. The quality of primary education in the Netherlands is at stake. This problem derives from the national trend of teacher shortages and high teacher turnover rates in primary education. In 2020 the expected shortage is 2409 FTE which increases in just only five years to 6217 FTE. On the short-term schools have increased personnel costs because of high recruitment costs. Due to the high teacher turnover rates the quality of teaching is decreasing. On the long-term this will even slowly impact the labour market of the Dutch economy in a negative way.

***Goal*.** Since there is not much written about this topic in Dutch context, the goal of this research is to study the characteristics of teacher turnover.

***Method*.** This research consists of two parts. The first part is a literature review which identifies the characteristics of teacher turnover in primary education. Based on this review a theoretical model is proposed. The second part consists of testing a part of the model. The data consists of 5993 primary school teachers throughout the Netherlands. The analysis that is used is the binary logistic regression. Because of the mixed usage of assumptions in logistic regression this thesis will conduct two logistic regressions. The variables that are included in the research are: gender, age, tenure, amount of schools, number of contracts, FTE and salary.

***Results*.** Based on the literature review the following topics are characteristics of teacher turnover: preparation/qualification, student characteristics, working conditions, personal characteristics, non-work factors, natural teacher turnover. The logistic regression found no statistical difference in gender. Teachers with higher age and higher number of FTE have a significantly higher chance of teacher turnover. While teachers with longer tenure, work on multiple schools with more contract and a higher salary tend to have a significantly lower chance of teacher turnover.

Practical implications. The first problem is that of *attracting new teachers*. First of all, it is remarkable that there is a large gender gap in schools. In this dataset males represent only 20% of the dataset. It is important to identify needs of male teachers to also attract them. Regarding attracting in general, schools should put more emphasize on the fit between teachers and schools. The second problem is that of *retaining teachers*. Teachers with a low tenure have a higher chance of leaving. This can be solved through a buddy system or a more creative solution a traineeship. A traineeship includes: building up experiences in different classes from different schools, working on a variety of projects, one fixed day for training/self-development and a coach/mentor. This is an attractive way to attract new teachers, it solves the skills gap of beginning teachers, and teachers can be deployed more flexibly. The 50+ group has a high chance of leaving which result in knowledge loss. They can play a role in this traineeship or buddy system to prevent valuable knowledge loss. Finally, it is recommended to use the model of characteristics of teacher turnover internally. A possible way is to translate it into a questionnaire which can be distributed by the school administration and must be filled in anonymously. Besides more qualitative data is needed to capture the motivations behind these

findings. The output of could then be used for improving policies based on data to decrease teacher turnover.

***Theoretical implications*.** Since there is a lot yet to discover about teacher turnover, specifically in Dutch context, more research is needed. This research aims to inspire researchers and practitioner to put teacher turnover on the agenda. Propositions for future research are provided in the end of this research.

Keywords: Dutch primary schools | teacher turnover | logistic regression | review teacher turnover | teacher attrition | teacher retention

Table of contents

Chapter 1
Problem definition

The purpose of this chapter is to describe the problem. This chapter therefore provides the current situation at three levels: national level, school level and business level. On the base of these insights, the problem will be outlined in the problem statement (paragraph 1.2). Thereafter, the problem will be reframed in the research question. This chapter will result in a description of the method and approach of the research.

1.1 The context of the problem

The subject of this research is tracking, explaining and predicting teacher turnover of primary schools in the Netherlands. There is actually, a discrepancy between the sum of teachers supply and demand that leads to a shortage. If this continues, the gap will be widened. The Dutch government has introduced new policies as a reaction to these developments. Schools must comply with these policies and need practical insights on how to reduce teacher turnover.

1.1.1 National context

Teacher shortage in the Netherlands will lead on the short term to increasing pressure on current teachers and on the long-term decrease in the quality of primary education in the Netherlands.

At the beginning of 2020, two Dutch employers' associations VNO-NCW and MKB-Nederland wrote in cooperation with entrepreneur association Oram and the municipality of Amsterdam a letter to Prime Minister Rutte. In this letter, they advocate for higher salaries, more funding for schools and improved teacher education (e.g. Pabo). They warn that if the current situation continues it will have serious consequences for the Dutch economy (Heilbron, 2020). This recent wake-up call illustrates that teacher turnover in the Netherlands is a hot topic. But how large is the issue?

The government asked the same question and looked in the exact numbers. Rijksoverheid predicts a shortage in the upcoming years. In 2020 the shortage is 2409 FTE. This number will increase to 8801 FTE in 2027. When looking at secondary education the shortcomings are slightly lower (Rijksoverheid, 2020c). In 2020 the shortage is 610 FTE which increases to 1203 FTE in 2027 (Rijksoverheid, 2020d). When looking at the FTE shortage the gap is the largest in primary education. For that reason, this thesis research will only focus on teachers of primary schools. The Dutch government recognises this problem and has therefore established guidelines to address the issue. To illustrate, to make the Pabo (Dutch study to become teacher) attractive for young students, the

government lowered the intuition fees. Second, more attention will be given to the side-inflow of teachers. Those who come from a different field of study. Third, the government made 430 million euros eligible for strategic personnel planning. This money is used by schools to reduce work pressure and retain teachers. Although the salaries of teachers have gone up, teachers are still unsatisfied with their compensation (Rijksoverheid, 2020c).

In the Netherlands, the turnover rates of teachers are high, particularly beginners with less than five years of experience. A study conducted by Rijksoverheid (2020e) investigated how many graduates stayed in the field of education. They looked at graduates from 2015, 2016 and 2017. Of all who graduated in 2017, 8 per cent left which is only one year after finishing their studies. In the 2016 cohort, the percentage is even higher. 11 per cent left their job after just two years. After three years, the percentage is the highest. Of the 2015 cohort 15 per cent left. Not just the beginners seem to quit the job early. Teachers who are approaching retirement tend to show the same behaviour. Based on data of 2018 this is a problem since 1 in 5 teachers is 55 years of age and older (Rijksoverheid, 2020e). The same patter occurs comparing these statistics with other countries. The overall trend is the U-shaped curve which indicate that teacher turnover is highest for beginners and teachers near retirement (Billingsley & Bettini, 2019). Thus, the national developments are similar to trends outside the Netherlands.

In the US it is expected that attrition rate of teachers within their first five years is between 30 to 50 percent in high-poverty areas. A similar study in Australia predicts a 30 to 40 per cent. In the UK is has been reported that up to 50 per cent of graduates are not in the teacher profession after five years (den Brok, Wubbels, & van Tartwijk, 2017). Even in Norway 33 per cent of beginning teachers leave the profession (Tiplic, Brandmo, & Elstad, 2015). In other countries this rate is much lower. For example, in Hong Kong the teacher turnover rate is between 4.8 and 5 per cent (den Brok et al., 2017). Although in general these rates seem to be rather high, in the literature, there is still a debate when comparing to other professions. Some argue that overall teacher turnover in general is higher while others state they are similar (den Brok et al., 2017). 3-4 % in Finland and Singapore annually and in US annually general 8,4 in 2008 (Carver-Thomas & Darling-Hammond, 2019).

The lack of teachers has consequences for the quality of the educational system. Schools take certain measures to fill in the gaps. These include increasing the size of the class and the need to constantly recruit teachers. Greater classrooms mean less individual attention for students and an increase in workload for teachers. Besides, new teachers need time to adjust to the school's culture. It is hard, in particular for beginners because they are still developing their teaching skills. Some schools are even forced to put unqualified teachers in front of the classroom. If the current situation continues to proceed, it will decrease the quality of the educational system. Also, this will not contribute to the vision of the Netherlands as a "knowledge economy"(Durazzi, 2019; Ridder, Zitter, & De Bruijn, 2019).

1.1.2 School administration and school's context

Primary schools need insights on teacher turnover reduction in order to be able to achieve the KPI's provided by the Dutch Government.

In addition to the metrics listed above, the Dutch government has set out standards and KPI's for schools to comply with. These are included in the document called "Bestuursakkoord PO 2019" which focuses only on primary education(Rijksoverheid, 2019). This document includes KPI's on lowering

teacher turnover rates. This document aims to provide primary schools with a dot on the horizon. In regards to these arrangements, the government provides resources (Rijksoverheid, 2018). They are primarily monetary but also in the context of projects as well. One such initiative is "Ruimte in Regels" (Rijksoverheid, 2017). The government developed a brochure aimed at inspiring schools and teachers to open a dialogue on their work pressure. In addition, this document provides guidance the most important administrative tasks. As a result, teachers reduce administrative work pressure. This initiative has made it possible to put the so-called hard rules in context and to seek more flexible solutions.

From an external perspective there is pressure from the government to act. From an internal perspective high teacher turnover rates have influence for schools and school administrations as well. With a high turnover rate, HR costs are high because new teachers need to be recruited/introduced and trained. Besides, teachers who quit after several years have high transfer and replacement costs. Furthermore, because of the teacher shortages, classes are growing and less individual attention can be provided to individual students. Decreasing the quality of education. Schools and school administrations have challenges regarding attracting and retaining teachers.

To summarize, the government has adopted several initiatives but they seem to focus only on guidelines and goals. The schools/school administrations are still responsible for complying with these measures. If they will not act the quality of education is decreasing. There is a need for insights regarding in attracting and retaining teachers in primary education in the Netherlands.

1.2 The problem statement and research goals

'What are the characteristics that contribute to predicting teacher turnover of primary schools in the Netherlands?'

Based on the information provided above, the problem can be summarized as follows. The overall trend is that turnover rates are high among primary teachers in the Netherlands. It is difficult to attract and retain teachers, especially young talents and those close to retirement (Rijksoverheid, 2020e). From a national perspective, the quality of education is declining which is bad for the economy in the long term. From a school perspective, it is important to reduce costs, retain teachers and maintain quality.

The following research question is formulated based on the research problem: 'What are the characteristics that contribute to predicting teacher turnover of primary schools in the Netherlands?'. The objective within the research is to design a research model of characteristics that predict teacher turnover within primary schools.

The theoretical relevance of this research is to contribute to the teacher turnover research for primary education in the Netherlands. There is a limited amount of research in this specific context in published in journals (den Brok et al., 2017). Teacher turnover literature focusses mainly on countries outside the Netherlands. Therefore, research in this specific context is relevant to be able to contribute to the reduction of the national issue of teacher shortages.

The practical relevance is to provide schools and school administrations with insights how they can attract and retain teachers.

Now that the issue and goals are stated, Chapter 2 will start from a theoretical perspective. This chapter dives into the characteristics in international literature on teacher turnover in primary education. This chapter concludes with a conceptual model. Thereafter, a part of this model is tested. Since the model contains multiple depended variables and a dichotomous independent variable the method binominal logistic regression is used, which are described in chapter 3. The results of the analysis can be found in chapter 4. This chapter concludes with a comparison between two models and the impact of using different assumptions. Lastly, the discussion and conclusion are written down in chapter 5. This chapter also includes propositions for future research and practical implications.

Chapter 2
Theoretical framework

This chapter includes a literature review about teacher turnover research. There is a difference between employee turnover research and teacher turnover research since the latter only focus on the context of teachers. In this literature a variety of research databases are used: google scholar, ebscohost, web of science and scopus. Interestingly, not many Dutch publications can be found in scientific journals (den Brok et al., 2017). Therefore, two other sources were consulted; international teacher turnover literature and publications/reports of research institutes in the Netherlands. These include; DUO, CBS, StatLine, Mirrorpedia, Centerdata and TNO. The findings are presented below in no particular order of importance.

Preparation/qualification

This variable refers to the preparation of the teacher. It refers to the time before the first teaching job, i.e. study and qualification. It also applies to the preparation and training during the first phase of employment as a beginning teacher. Therefore, this variable consists of; a) qualification, b) onboarding/induction programme, c) mentor and d) experience

Qualification. There are three kinds of routes that someone can take to become a teacher. The first route is through regular study (Pabo or University degree in Education), the second route is alternative schooling and the third way is no schooling (in the field of education). There is not enough scientific research in the Netherlands to compare these different backgrounds and their effect on turnover. However, these distinctions are consistently found in international literature. In the US, for example, there are major differences between teachers turnover depending on their qualification (Billingsley & Bettini, 2019). Vagi, Pivovarova, and Miedel Barnard (2019) found that the study (preparation) of the teacher had an impact on the intention to leave or stay. In the US a study by Carver-Thomas and Darling-Hammond (2019) found that teachers who followed an alternative programme were 25 per cent more likely to leave. This suggests that the regular programme does its job of preparing students better than alternative programmes. This does not suggest that the regular programme is perfect. A Dutch study by Helms-Lorenz, van de Grift, and Maulana (2016) reveals that schools perceive the starter level of graduates as too low. It can be expected that student form regular studies will have a lower chance of teacher turnover. To sum up, on the basis of evidence from the US and based on logical rationale it is expected that teachers with a degree via the regular route will have a lower chance of teacher turnover.

Regular study teacher. A teacher can receive a qualification via the regular route, in the Netherlands this is via the study Pabo or a University degree in education. Even though the regular study provides the best background, the study of Helms-Lorenz et al. (2019) show that the expected level of beginning teacher is still under the expected level. The two-yearly survey from the Ministry of Internal Affairs showed that 44% of the school management is satisfied with the quality of beginner first-degree teachers and 56% of beginner second-degree teachers (Helms-Lorenz et al., 2019). To sum up, this is the most common way to receive a teaching degree but even their preparation can is not fully meet expectations from the field. The chance of having a job is slightly higher for teachers that graduated following the full time programme instead of the part time programme. The research called "loopbaanmonitor 2019" is based on micro data of teachers between 2012 and 2018 (de Vos, Fontein, & Vrielink, 2018).

Alternative schooling. Alternative education includes teachers who originally came from other disciplines and are referred to in Dutch "zij-instromers", side influx. Per category (e.g. primary, special education) there are different criteria and studies one have to follow to obtain a qualification (Rijksoverheid, 2020a) in order to receive the qualification to teach. An example of this alternative path can be found in the US, which recruit new teachers with the Teach for America programme. Similar programmes are also being implemented in the Netherlands to attract new teachers and by offering higher salaries (den Brok et al., 2017).

No schooling. It is likely that due to a shortage of teachers some schools are required to allow unqualified teachers in front of the classroom (Rijksoverheid, 2020b), see also appendix D. They do not have officially obtained the basic teaching skills which suggest that their skill set could be arguable. Teachers who do not poses the proper qualifications have a higher chance of leaving (den Brok et al., 2017; Vagi et al., 2019).

Induction programme. Because there is a discrepancy between expected level and the actual level of a beginning teacher, induction programme of importance. In literature induction is more often used than the term onboarding. Such programmes are intended to introduce the teacher to work methods, culture and colleagues (Kutsyuruba, Walker, & Godden, 2017). Another aim of the induction period is the reduction in tasks to avoid workload, stress and burnout. Numerous studies in the Netherlands demonstrate the positive effect of induction programmes on decreasing the chances of teacher turnover (den Brok et al., 2017; Gaikhorst, Beishuizen, Roosenboom, & Volman, 2017; Harmsen, Helms-Lorenz, Maulana, & van Veen, 2019). Therefore, it is expected that teacher with an induction programme have a higher chance to stay.

Mentor. Mentoring refers to the personal guidance of beginning teachers, most often by experienced teachers (Richard M. Ingersoll & Strong, 2011). A mentor can serve as emotional support and helps the teacher cope with stress and adapt to the school culture. Additionally, the mentor takes on the role of coaching. Several national and international studies demonstrate that teachers with mentors have a higher chance to stay in the profession (Billingsley & Bettini, 2019; den Brok et al., 2017; Kutsyuruba et al., 2017; Smith & Ingersoll, 2004). Particular for beginning teachers, Helms-Lorenz et al. (2016) argue that the beginning level difference could explain this. Although overall, it is expected that a

mentor will lead to fewer turnover intentions it is not a guarantee. Having a mentor may lead to disagreement, such as the "right" way of teaching (Pillen, Beijaard, & Brok, 2013). A study conducted in Norway reported mixed results. In some cases, mentorship was reported as available. However, due to lack of time, it was not done properly according to beginning teachers (du Plessis & Sunde, 2017). Thus, although it dependents on the quality of the mentor, overall it is expected that a mentor decreases the chance of turnover. The governmental Department of Education acknowledges the importance of guidance as a beginner. This is shown by the goals written in the "Leraren-Agenda 2013-2020". The Minister of Education, Culture and Science and the Minister of Primary and Secondary Education and Media wrote a letter to the "Tweede Kamer" to inform them about the developments in education (van Engelshoven, 2017). An example is the project "Begeleiding Startende Leraren" which is implemented in nine different regions. In this letter, they describe an increase in the percentage of teachers that receive guidance during their first year, but the proportion of teachers that receive systematic guidance is still low, especially in primary education. Thus, the results from Norway also apply to the Netherlands.

Experience. This variable refers to the years of experience of the teacher in the field of education. More experience leads to the development of teaching skills and therefore better preparation for the teaching job (Billingsley & Bettini, 2019). To illustrate the study of Hancock and Scherff (2010) demonstrate that, for every five years of experience the chance of being classified as high-risk teacher turnover decreases by average with 23 per cent. Of course, this is solely based on their dataset. However, it indicates that experience has an impact on teacher turnover. This could also be explained by self-efficacy, the own belief that you are capable of teaching (van der Want et al., 2019). The more experienced, the more confidence which lead to lowering the intention to leave.

Preparation and qualification impact teacher turnover.

Hypothesis 1 | Teachers that are qualified through the regular programme have a lower chance on teacher turnover than teachers from alternative programs.

Hypothesis 2 | Uncertified teachers have a higher chance of teacher turnover

Hypothesis 3 | Teachers that followed an induction programme have a lower chance of teacher turnover than teachers without such a programme.

Hypothesis 4 | Teachers with a mentor have a lower chance of teacher turnover than teachers without a mentor.

Hypothesis 5 | The more experience a teacher has the lower the chance of teacher turnover.

Student characteristics

The most common explanation of student characteristics in literature is their background. This is often measured in SES level. SES an abbreviation of the socio-economic status of the student population at a school (Gaikhorst et al., 2017). International studies find that teachers in high-poverty schools appear to leave more frequently (Darling-Hammond, 2010).

SES level. Urban areas are often mixed. Including well-paid and highly educated jobs that result in high-income families with a high SES. On the other hand, involving lower-skilled jobs and minimum

wages which resulting in lower SES. Lower SES can also be found in households with a variety of ethnical backgrounds. These changes in urban areas reflect the background of children in schools. Resulting in a combination of children with high and lower SES. It should be remembered that a low or high SES level does not reflect the qualities of levels of a student, but that lower SES level schools face different challenges (Gaikhorst et al., 2017). In a Dutch study in urban schools, parental communication is one of the key problems. Aside, from high workload, stress and inadequate guidance. Highly educated parents are in general critical and demanding. On the other hand, communication to parents of lower SES was also regarded as a challenge. Teachers sometimes have to communicate with parents who speak a different language and have different culture/values than the teacher. Teachers experience in both scenarios pressure. Schools with predominantly high SES children face judging parents. While schools with mainly low SES children are controlled by the government. In the sense that the government pressures schools to provide special attention to those students. But the teacher lacks the time to do so. Thus, the SES level of students brings problems an could lead to the teacher leaving a certain type of school (low or high level). Evidence from the Netherlands whether low or high SES levels contribute are influencing turnover is scarce. Even in international literature results are mixed, some find low SES schools have higher turnover rates and other studies find the opposite (Borman & Dowling, 2008; Hughes, 2012). To sum up, SES may affect teacher turnover but based on conflicting evidence it is unclear how this relationship functions.

Student characteristics impact teacher turnover.

Hypothesis 6 | The lower the level of a school SES the higher the chance of teacher turnover.

Working condition

A large predictor of teacher turnover or intention to stay is the work conditions. These variables are about the working conditions in a school and additionally considers the context as well. These includes: perceived demands, perceived administrative support, collegial support/collaboration, salary, pay-rate, autonomy, professional development and unemployment rate.

Perceived demands. The work of a teacher is very demanding. Teachers have to deal with high psychological tasks which over time can cause tension, stress, negative emotions and discontent. (Harmsen, Helms-Lorenz, Maulana, & van Veen, 2019; Tiplic et al., 2015; van den Berg, Glebbeek, & Bosman, 2012). The level of stress that someone handles is unique for each individual because everyone perceives stress differently. This is well illustrated by the job demand-resources model by Bakker and Demerouti (2007). They divide job demands and job resources. Too much job demands will lead to reactions of stress and can cause turnover (Bakker & Demerouti, 2007). The demands in teaching are increasing. Classes are growing due to the lack of teachers. As a result, personalised attention to each unique student is difficult. In addition to teaching, the teacher is responsible for administration which is time consuming, having meetings with colleagues or parents, attend other activities organized by the school and have to find time for self-study (Carson, Baumgartner, Matthews, & Tsouloupas, 2010; Carver-Thomas & Darling-Hammond, 2019; Vagi et al., 2019). All these activities can be roughly categorised in two biggest sources of job demands: student needs and

non-teaching activities. This is not a new topic in the Netherlands. The Dutch Government recognized the problem and, therefore, created in 2013 the "leraren agenda 2013-2020 (van Engelshoven, 2017). In order to alleviate job pressure "ruimte voor regels" has been introduced. This project provides guidelines on what is expected of teachers regarding administration and accountability. Although the subjects and issues on the agenda are clear, it is still a work in progress due to the lack of teachers.

Student needs. Teachers have the responsibility of including every student and therefore comply to their individual needs. The current trend is that classrooms are becoming larger and larger as responds to a short time solution of dealing with teacher shortages in the Netherlands (Rijksoverheid, 2020b). As a consequence, filling the student needs is and will become more difficult and put more pressure on teachers. Especially for teachers in special needs schools this is a big challenge. They experience high levels of emotional exhaustion which lead to teacher turnover (Billingsley & Bettini, 2019). A study of Harmsen, Helms-Lorenz, Maulana, and van Veen (2018) show that these perceived high demands lead to responses as; stress, tension, negative emotions and even discontent. Indicating that the kind of school (special/regular) is of influence. Hence, increasing the chance of teacher turnover.

Non-teaching activities. Besides teaching activities, teachers are also responsible for a lot of tasks outside the classroom. A teacher has to design tests and exams, create a syllabus, administrative tasks, mark tests, conversations with students/parents, team meetings and other activities organised by the school (Carver-Thomas & Darling-Hammond, 2019). Thus, teachers have to find or create time to finisch all the activities mentioned above which causes stress. Harmsen, Helms-Lorenz, Maulana, van Veen, and van Veldhoven (2019) argue that the combination of student demands and non-teaching activities are even more difficult to manage for beginning teachers. Hence, increasing turnover chances for both experiences teachers as for beginning teachers.

Coping strategy. The teacher job is very demanding. It means that the teacher has to deal with highly psychological tasks. Each teacher has their unique way of coping. A Dutch study found that that the most commonly used approach was actually to speak to their significant others (Pillen et al., 2013). Another approach was to share experiences with other teachers/mentor (van der Want et al., 2019). How someone deals with emotional situations affect how demanding they perceive tasks.

Perceived administrative support. A school consist not solely of other teachers, but also administrators who influence the chances of teacher turnover. Swars, Meyers, Mays, and Lack (2009) found that a supportive administration contributed to the reason why teachers stay. For instance, they can help with providing enough resources (Billingsley & Bettini, 2019). Additionally, administration can help when there is a problem and therefore influence the perception that the teacher is not alone (Swars et al., 2009). This is because administrators can support the teachers by providing and supporting a positive environment and culture in a school.

Resources. Billingsley and Bettini (2019) found in their meta study that teachers who have the idea that administrators are supportive have a lower chance of teacher turnover. This is because administrators contribute to the availability of resources that teachers can use to increase their effectivity. Examples are software and hardware that teachers/students use but also help with student

discipline and instructional methods (Swars et al., 2009). A work environment that is organised well and the felt assistance from administrative, contribute to a lower chance of teacher turnover.

Collegial support/collaboration. Collegial support refers to emotional support whereas collegial collaboration is about working together for example in a team. Support and collaborating with colleagues does make a difference in teacher turnover. As mentioned before the teacher profession can be demanding which makes it somewhat of a relief to be able to talk to colleagues on an emotional level and a cognitive level to help with finding solutions (Billingsley & Bettini, 2019; Carver-Thomas & Darling-Hammond, 2019; Cobb, 2015; Russell, Williams, & Gleason-Gomez, 2010). Both can help to enhance teachers' learning, help to deal with high psychological tasks and help teachers to get to know the schools' structures and methods (Billingsley & Bettini, 2019; Guarino, Santibañez, & Daley, 2006). In particularly for beginning teachers it is perceived as a warm welcome when colleagues are collaborative and can help with issues they come across Therefore, having collegial support and collaboration reduces the chance of teacher turnover.

Salary and pay-rate. This is an often-discussed topic in teacher turnover literature and in Dutch newspapers (Billingsley & Bettini, 2019; Carver-Thomas & Darling-Hammond, 2019; Guarino et al., 2006; Hancock & Scherff, 2010). The many protests in the Netherlands show that teachers are dissatisfied with their salary. Because they have a very high workload and have a wide range of responsibilities and feel under appreciated. In a survey of ArbeidsmarktPO (2020) among teachers in the Netherlands the largest reason for leaving the sector was due to a low monetary reward. Currently, the only way to make more money is to go to have a higher function, but job options at schools are in general very low. There are thus not many options left other than to leave the teaching profession and work in another sector (van den Berg et al., 2012). Therefore, it is expected that teachers with a higher salary/pay-rate have a lower chance of leaving.

Autonomy. Autonomy refers to which extent the school context provides educators to make own decisions about their work (Billingsley & Bettini, 2019). The study of Guarino et al. (2006) show that schools in the US that providing a larger degree in autonomy experience lower teacher turnover. Billingsley and Bettini (2019) concluded that in the US autonomy has an indirect link to lower levers of teacher attrition. In the Netherlands it is always a trade-off between autonomy and control (Veugelers, 2004). Veugelers (2004) found a disturbance between the balance of top-down regulation and the bottom-up approach. The main explanation is that governments influence and control the schools and the school in turn controls their teachers. More and more teachers would like to see a more bottom-up approach which includes higher levels of autonomy. Currently the balance is perceived as disturbed. On the one hand, teachers are seen as the professional but how can you act professional when you are executing tasks imposed from the schools management or government (van den Berg et al., 2012). A lack of autonomy could hamper the professional development of teachers (Veugelers, 2004). Guarino et al. (2006) found that autonomy granted to teacher (in combination with administrative support) are important when teachers are deciding to leave or stay in the job. This is also found to have an large impact on, specifically, first year teachers (Swars et al., 2009).

Leadership style. The perceived autonomy is strongly influenced by leadership style. The perception of schools 'leadership (and culture) is a strong predictor, especially for beginning teachers, in their decision to leave the school. Leadership style that is based on trust and acknowledgment as a positive effect on autonomy of teachers (Oosterhoff, Oenema-Mostert, & Minnaert, 2019). The more trust and acknowledgment a leader provide the higher the levels of perceived autonomy and therefore the lowering the chance of teacher turnover.

Trust. Trust is about the relationship between a leader and a teacher that is based on mutual respect, working together, commitment and the feeling of being able to rely on each other (Hassan & Ahmed, 2011) The leader (e.g. team leader, management, principal) trust the teacher with a certain task and shows trust in the capabilities of a teacher. Trust is beneficial for creating a professional environment in which the teacher can act autonomous (Oosterhoff et al., 2019).

Acknowledgement. Acknowledgement is a fundamental human need and a strong motivator (van den Berg et al., 2012). It is about the actions of the leader (e.g. team leader, management, principal) that lead to teachers' feelings of acknowledgement for his or her work and achievements.

Professional development. Another goal of the Dutch government is to improve the career perspective of teachers. Based on a survey among primary education teacher in the Netherlands the second highest reason for leaving the job is due to a lack of professional development (ArbeidsmarktPO, 2020). This includes having conversations about the performance but also the possible career paths. The latter is in the primary education difficult since it is a fixed career path in the sense that it does not contain a lot of options and growth opportunities (van der Want et al., 2019; van Engelshoven, 2017). The lack of professional development partly contributes to the stress factors of teachers and therefore burnout. The teacher knows that when developing him or herself contributes to the quality of the teaching in the class and therefore the overall organisation goals. The report of Berenschot (2018) on this subject show similar results. Teachers want more growth paths. This report found that there are some possibilities for a school to create a career path. They have identified different roles for example: teacher-coordinator, teacher-specialist, teacher-coach, teacher-researcher etc. In adding on specific tasks to the job teacher one can develop in a certain area.

The international study of Kraft, Marinell, and Shen-Wei Yee (2016) identifies that professional development is strongly related to the chance of teacher turnover and influences also the results of students. A more recent meta study of Billingsley and Bettini (2019) show identical results. They found that teachers who have more opportunities and support from administrators about their professional development they tend to stay. This finding is found across different studies in quantitative as well in qualitative studies. Additional meta study finds identical results (Nguyen, Pham, Springer, & Crouch, 2019). To conclude, opportunities for professional development are important when it comes to the decision to leave the school.

Unemployment rate. Based on a survey of "loopbaanmonitor" (ArbeidsmarktPO, 2020), the unemployment rate has an effect on the chance of staying in the field of education. They found that the higher the unemployment rate, the higher the chance of teachers staying in their profession. A potential

reason is that higher unemployment levels indicate difficulties in pursuing a new job which means that a teacher might risk unemployment.

Type of contract. The loopbaanmonitor onderwijs (ArbeidsmarktPO, 2020)) survey show that the type of contract strongly influences the intention to leave the organization. When teachers only receive temporary contracts, it does not reflect trust. Combined with the feeling of insecurity can make a teacher reconsider its job and intention to leave. Also, the size of the contract (amount of FTE) is important. When a teacher is not able to increase its working hours, it is tempting to look for other jobs.

School characteristics. There is not much research conducted the effect of school characteristics on primary schools in the Netherlands. Helms-Lorenz et al. (2016) describe the following variables in school characteristics: lack of communication, expectations are unclear, lack of career developments. Still these are more about culture and possibilities than about organizational variables. Although there is a small amount of research written about it Bonhomme, Jolivet, and Leuven (2016) suggest the following variables that could influence teacher turnover: the size of a school, the size of school classes and the quality of a school.

Working conditions impact teacher turnover.

Hypothesis 8 | The higher the perceived demands of a teacher the higher the chance of teacher turnover.
Hypothesis 9 | The higher the perceived administrative support the lower the chance of teacher turnover.
Hypothesis 10 | The higher the perceived collegial support the lower the chance of teacher turnover.
Hypothesis 11 | The higher the salary the lower the chance of teacher turnover.
Hypothesis 12 | Teachers that are in the end of their pay-rate have a higher chance of teacher turnover.
Hypothesis 13 | The higher the perceived autonomy of a teacher the lower the chance of teacher turnover.
Hypothesis 14 | The more opportunities for teachers on professional development the lower the chance of teacher turnover.
Hypothesis 15 | The more perceived autonomy by a teacher the lower the chance of teacher turnover.
Hypothesis 16 | The more contracts a teacher has (indicating temporary work or replacement work) the higher the chance of teacher turnover
Hypothesis 17 | The more schools a teacher employes the higher the chance of teacher turnover
Hypothesis 18 | School characteristics (i.e. school size, quality and class size) impact teacher turnover

Personal characteristics

Although the schools' environment is affecting the teacher's intension to stay or leave, the fit between the teacher's personal characteristics and this environment has to be there. In the literature review about employee turnover this was captured in the job embeddedness model. In the Netherlands there is not much research conducted about this variable. The most common aspects of personal characteristics found in international research include: age, personality, race, gender and social economic status (SES).

Age. Prior studies showed all over the world the same "U-shape" relationship between age and teacher turnover (Billingsley & Bettini, 2019). Turnover is higher in the first five years of the teacher's career, it decreases after that until the retirement age is in sight. Therefore, this research expects that there will be found similar results.

Race and gender. Research from the US found differences between people of colour and white teachers but this had often to do with other explanations of which SES of the school played a role (Hancock & Scherff, 2010). In general studies show that there is no sufficient prove that race is predicting teacher turnover (Billingsley & Bettini, 2019). Based on the evidence and from an ethical perspective race will not be included in this research. Gender will be included.

Personality big five. Kim, Jörg, and Klassen (2019) conducted a meta study including 25 studies that found a relationship between personality and two teacher related outcomes. Personality was measured based on the Big Five personality. Job related outcomes refer to the teacher effectiveness and burnout. The results of this study show that, apart from agreeableness, every dimension (i.e. extraversion, conscientiousness, emotional stability and openness) relates to the two job related outcomes. Extraversion and conscientiousness are strongly related to teacher effectives. Whereas emotional stability is most strongly affecting teacher burnout. This indicates that there is likely an effect of personality on teacher effectiveness and burnout. When a teacher does not perform well and or show indications of burnout this influences the chance of teacher turnover. Important to note is that this meta study only included 25 studies, besides the authors acknowledge that there is a limited amount of studies conducted in this area (Kim et al., 2019). Therefore, Big Five personality will not be included in this research.

Job performance. Based on the first model of predictors of employee turnover job performance is mentioned as one of the predictors. In contrast to the second model of teacher turnover this literature research suggest that job performance is not included as one of the most influenceable variables that have an relationship on teacher turnover. Tehseen and Hadi (2015) explain this by pinpointing that the variable job performance does not tell why someone underperforms. Job performance is a result of underlying variables. Based on the evidence found it was chosen to exclude this variable because the measure is likely too much influenced by other variables for example already mentioned in the model through for example: perceived demands, autonomy, SES and perceived administrative support.

Person-organisation fit. Every individual has certain values and norms. Teachers have a higher chance to leave a school when it does not fit their own norms and values (Kutsyuruba et al., 2017). Besides research found that a shared vision also contributes to the intention to stay (Swars et al., 2009). Multiple Dutch studies underline the high stress levels in the teaching profession (Harmsen, Helms-Lorenz, Maulana, & van Veen, 2019; Kim et al., 2019; Pillen et al., 2013). (Pillen, 2013) investigated how beginning teachers deal with all the demands, also called coping strategy. These emotions are a consequence of the tensions in teachers' professional identity development which is defined by Pillen

(2013) "as the process of integrating one's personal knowledge, beliefs, attitudes, norms and values, on the one hand, and professional demands from teacher education institutes and schools, including broadly accepted values and standards about teaching, on the other" (p.243). It is expected that when the person-organisation fit is high the teacher will have a higher chance to stay.

Self-efficacy. International and Dutch studies show the relation between a teacher's self-efficacy and turnover. Self-efficacy is about a teacher's believe in his or her capacity to affect desired outcomes. These refer to student engagement and learning. Specific examples are the ability to maintain classroom order, influence student's engagement and the ability to apply pedagogical techniques. Self-efficacy also influences the intra-personal role identity and the person-organisation fit as mentioned earlier. The lower the level of self-efficacy the higher the chance of teacher turnover (van der Want et al., 2019). The preparation, mentoring and induction programmes can influence this level of self-efficacy (ArbeidsmarktPO, 2020).

Tenure. The longer someone has a particular job the more confidence someone is. Not only the confidence level rises also dealing with work pressure becomes easier (van der Want et al., 2019). Therefore, it is expected that teachers with higher tenure will have a lower chance to leave the school.

Personal characteristics impact teacher turnover

Hypothesis 19 | Beginning teachers (teachers with less than 5 years experience) have a higher chance of teacher turnover.

Hypothesis 20 | Teacher near their retirement (teachers with less than five years before retirement) will have a higher chance of teacher turnover.

Hypothesis 21 | The more the teacher has a person-organisation fit the lower the chance of teacher turnover.

Hypothesis 22 | The higher the level of self-efficacy of a teacher the lower the chance of teacher turnover.

Hypothesis 23 | Teachers with higher tenure will have a lower chance of leaving

Non-work factors

Nonworking reasons for leave. In addition to all the above-mentioned reasons for leaving, on important reason was not yet discussed. These are reasons that the schools are not able to influence. Think about reasons for leaving because of having a child, childcare (Billingsley & Bettini, 2019; Guarino et al., 2006; Pillen, 2013) own health and family moves (Billingsley & Bettini, 2019). These reasons are mostly referring to personal reasons or choices which schools are not able to influence.

Hypothesis 24 | Nonworking factors increases the chance of teacher turnover.

2.1 Conclusion

Characteristics that predict teacher turnover: preparation/qualification, student characteristics, working conditions, personal characteristics and non-work factors.

This chapter has reviewed the teacher turnover literature. An important overall conclusion is that there seems to be no unified model for teacher turnover. Although each model in the last century is built on each other, every model seems to have its own perspective or adding new variables. It can be concluded that merging models together will cause problems. First of all, there are differences in definitions. Secondly, with so many variables underlying relationships (causal, moderation etc.) it will be hard to keep track of. Thirdly, from a practical point of view the model will never be hundred percent covered by the dataset. It can be concluded that due to size of the model, differences in definitions and data collection issues it is impossible in this timeframe to use such a large model. Therefore, focus is needed.

Based on the literature presented above it can be concluded that there is a lot of research conducted in the field of teacher turnover but not that much in the Netherlands. Based on the literature review teacher turnover is predicted by: preparation and qualification, student characteristics, working condition, personal characteristics and non-work factors.

This model as presented in figure 3 is the final conceptual model. Some adjustments are needed to fit the model to the available data, see chapter 3.

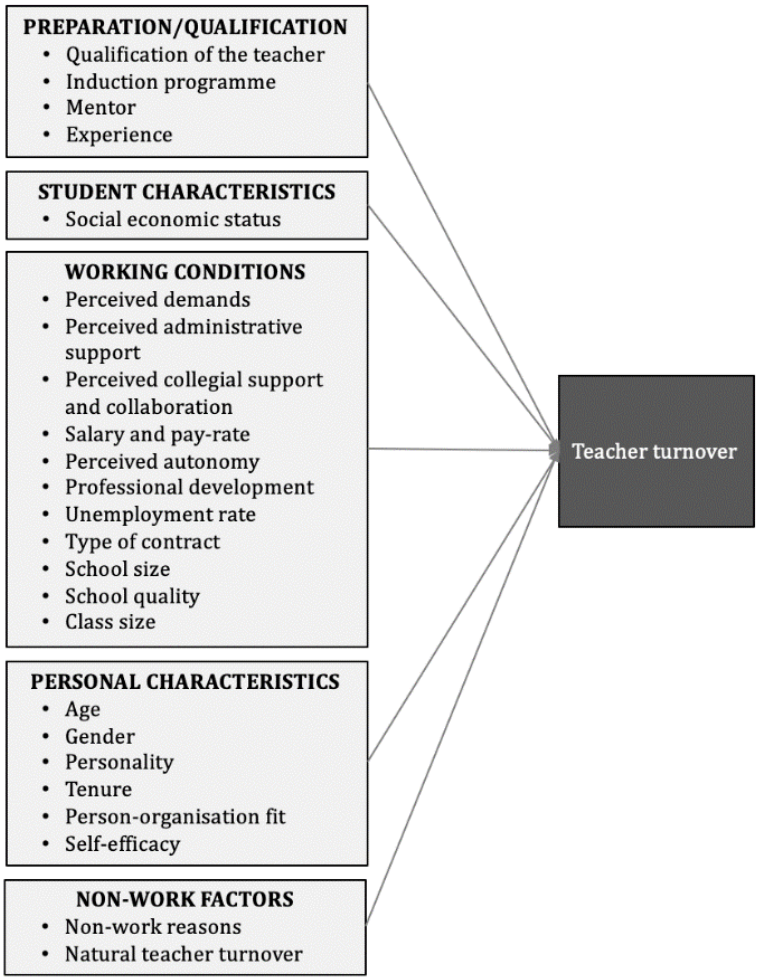


Figure 1 | Proposed teacher turnover model

Chapter 3
Research Design and Methodology

This third chapter includes the research design and methodology of this research. For this research secondary data is used from the company that collaborates on this thesis project. The research design consists of two parts: overall trends 2016-2019 and the individual analysis. This section describes how the theoretical model was downscaled due to unfortunate events. The final operationalized model is included, methods are described and assumptions are tested.

3.1 Research design

This data that will be used is from the company that contributed to this study. The company has multiple clients (school administration offices) of which one will be the focus of this research. The reason is that this specific school administration office uses an HR tool. This research has data of the last 5 years (2016 to 2019). To ensure privacy, this research will not publish any names of school administrations, schools or teachers. The research design includes two parts.

1) Part one: general trends 2016 – 2019. The company has asked to provide a general overview of trends in teacher turnover over the last couple of years based on their dataset.
2) Part two: predicting teacher turnover single-level. This part involves predicting teacher turnover based on the most recent and complete dataset which is the year 2019. A binary logistic regression will be used. This analysis is conducted on teacher level.

3.2 Sampling

The data that is used in the data set is from one school administration office. This is chosen because a proportion of the schools belonging to them use an HR tool (which only afterwards was known that this was not available anymore). Additionally, the dataset is large and includes many different primary schools throughout the Netherlands.

3.3 Data collection and privacy

Besides the companies own dataset regarding teacher and school data another source of data in included. This dataset will be combined based on Teacher ID which is a random number. Teacher ID is important to be able to connect both datasets together. Besides, no names are mentioned in any dataset thus the teacher will be kept anonymous. To ensure no misuse of the dataset, the dataset was 'collected' by one of the employees so I was not able to see data that are not meant for my eyes. Furthermore, there is an agreement with the company that after graduation the dataset will be deleted since there is no use for me, as the researcher, to keep it.

The dataset was combined with some datafiles from CBS. In table 1 an overview is given which datasets are used. Most important to note is that the HR dataset was not available. This tool involves data about for example: leadership style, perceived autonomous levels, team collaboration etc. During the process of writing this thesis the third-party company withdrew and no data could be collected. Due to multiple circumstance, the company was unable to deliver the data on time. From their side, they derived at different organizational and data technical issues. Additionally, the situation around Covid19 did not influence this situation positively. Since the size of the choice was made to not collect extra data on HR. Also due to Covid19 this was not doable within the timeframe. Underneath an overview of the datasets.

Table 1 | Overview collected data

Source	**Datasets**
Company (as described in the introduction)	Achterstandsscores BesturenVerloop Medewerkers Organisatie_stroom_data OrganisatieMeta
CBS	Inkomen gemiddelde per gemeente Kwaliteit scholen Schoolweging_2017_2018_2019
Third party (a portion of the schools in the dataset also use an HR-tool from this third party company)	HR data → missing

3.4 Variables

Dependent variable: teacher turnover (no/yes)
Independent variables: age, gender, tenure, salary, FTE amount of schools employed and number of contracts.

Dependent variable teacher turnover

Teacher turnover is measured as a dichotomous variable. The teacher has either left the school administration or not. The variable teacher turnover will be coded as 1 (stay) or 2 (leave).

Independent variables

After merging all the datasets, it seemed that the amount of missing data was large. Furthermore, the dataset now contained multilevel data, the number of usable cases dropped to +- 500 cases of the 5993 cases. 500 cases seem enough to continue with but it does not represent a variety of schools. Therefore, it was chosen to drop the second level data (school level) and just continue with individual data (teacher level). This is why only the personal characteristics are tested in the model. Based on the theory this research question will be operationalized in the following variables: Age, gender, tenure, salary, salary level, salary scale, FTE, amount of school employed, number of contracts. The proposed personal characteristics include also personal-organization fit and self-efficacy both variables are not included in the final dataset because there is no data available. Underneath in figure 4 the operationalized model is visualized with hypothesis.

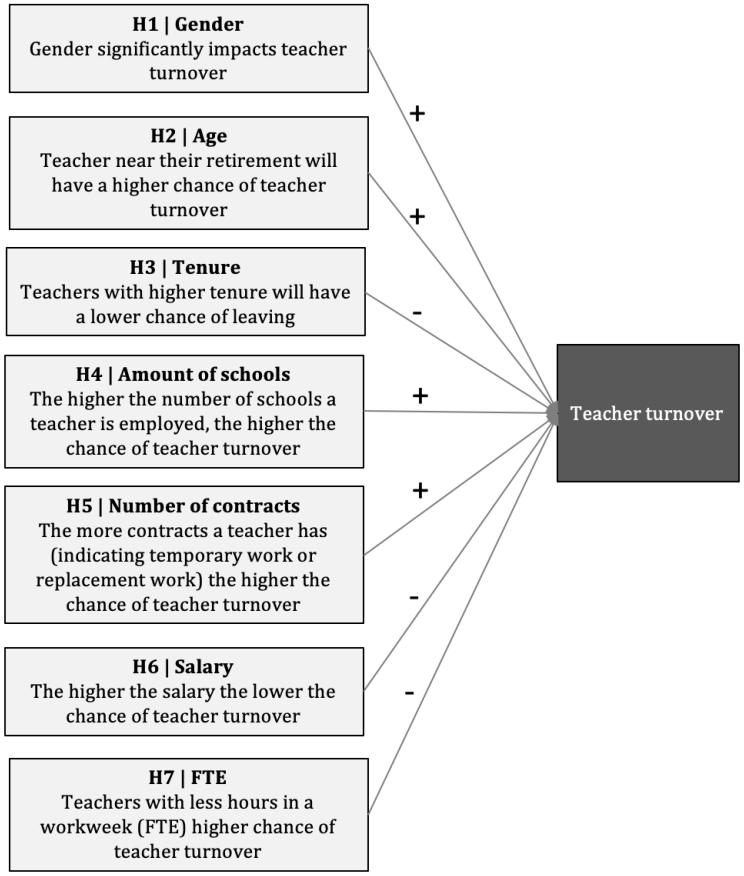


Figure 2 | Operationalisation model

3.5 Data analysis

Trends of teacher turnover 2016 to 2019

The goal of this analysis is to provide the company with trends of the years 2016-2019. Additionally, the company has collected some data regarding the reason of leaving. They have specifically requested to analyze this dataset in combination with trends in the last couple of years. A separate analysis will be conducted in the form of a frequency table and various visualization will be made in the results section. The software Microsoft Excel will be used to create visualizations as well as Microsoft PowerPoint to make them visually attractive.

Predicting teacher turnover

The method that is chosen is binary logistic regression. This method is used when the goal is to predict membership of two categories. In this research the dichotomous variable is Turnover teachers, to predict whether they belong to group 1 (the stayers) or group 2 (the leavers). Because in linear regression one of the assumptions is that the observed variable must be of a linear relationship. In this research the outcome variable is categorical. This is another reason why a linear regression is not chosen, otherwise this assumption would be violated. A fundamental difference between linear and logistic is that instead of predicting Y from multiple X variables, in logistic regression we predict the probability of Y occurring (Sommet & Morselli, 2017). Thus, whether or not the teacher leaves or stays. This method will be used to test whether the measures mentioned above are significant for individual (teacher) level. The software IBM SPSS will be used to analyze the data.

3.6 Assessing (which) assumptions

After reviewing literature opinions on which assumptions to use in logistics regression are mixed. To assess the impact of these differences the logistic regression will be conducted two times. The first analysis is according to less strict assumptions, which are also according to the assumptions used by the University of Twente. The second analysis will include the assumption of linearity of log odds, which is argued to be an important assumption that cannot be neglected.

Before the logistic regression can be run the assumptions need to be checked. When consulting literature about which assumptions to asses there seems to be a lot of disagreement. Although this method is widely used researchers apply assumptions of logistic regression in different ways. The problem with using different assumptions is the reliability of the results. An extensive literature review of Ottenbacher, Ottenbacher, Tooth, and Ostir (2004) illustrates this issue. Therefore, for this thesis there was enough reason to dive into this finding further. Different resources were found about assumptions. The guidelines from the University of Twente about logistic regression were also looked into. Underneath multiple perspectives are summarized.

There is some overall agreement that in order to choose for a logistic regression the dependent variable needs to be dichotomous and de independent variables are both category and continuous also the observations need to be independent.

Spicer (2005) argues that if the sample size is large enough (which it is in this sample) the test is robust enough. This means that the researcher does not have to deal with additional assumptions and put more emphasize on the model fit through Hosmer and Lemershow test (Hosmer, Hosmer, Le Cessie, & Lemeshow, 1997). The book of Hari (2014) which recommend the same assumptions.

Other studies argue that the logistic regression need more assumptions to have an increase in statistical power. Therefore, the data should be checked for: multicollinearity, large sample size and outliers (Bewick, Cheek, & Ball, 2005; Peng, Lee, & Ingersoll, 2002).

Based on the different viewpoints mentioned above one could conclude that there are some differences in usage of assumptions. Ottenbacher et al. noticed the same trend and conducted in 2004 a literature review on this matter. They concluded that not only the use of assumptions differs across studies, also the lack of transparency in which assumptions were used surprised them. Furthermore, together with other studies they stress the importance of an extra assumption. The assumption of linearity of the continuous independent variables to the log odds of the outcome variable (Field, 2013; Fitzmaurice, 2016; Mood, 2010; Ottenbacher et al., 2004). Although a lot of time has passed since 2004, the fact that more recent literature show different assumptions implies that even today there is still disagreement.

Because there is disagreement this thesis will conduct the logistic regression two times. The goal is to test if there are differences in outcomes when different assumptions are applied. The first analysis will include the assumptions mentioned by Spicer (2005) and Hari (2014) and the assumptions that increase statistical power. The second analysis will additionally include the linearity of log odds assumptions. Underneath the assumptions are tested.

Assumption #1 Appropriate outcome structure

The outcome variable 'Teacher turnover" needs to be binary. This assumption is met because the dependent variables is coded in two groups. Group 1 involving the teachers that stay and group 2 including the teachers that leave. Furthermore, the independent variables are both continuous and categorical.

Assumption #2 Observation independence

This assumption is met because observations are independent from each other and no teacher/school are mentioned twice for the same measurement.

Assumption #3 Absence of multicollinearity

In logistic regression it is important that there is as few multicollinearities among the independent variables as possible. Which means that if independent variables correlate highly among each other this will cause problems. The VIF scores (table 2) of all the variables are < 10 which means not much multicollinearity among the independent variables. Therefore, this assumption is met.

Table 2 | Collinearity

Variable	*Tolerance*	*VIF*
Salary	.651	1.536
Gender	.973	1.028
Number of contracts	.822	1.217
Amount of schools	.770	1.298
FTE	.750	1.334
Tenure	.798	1.253
Age	.850	1.117

Assumption #4 Large sample size.

The last assumption is related to sample size. To perform a good analysis, logistic regression requires a large dataset. This assumption is met the dataset without missing cases includes N = 5993 teachers.

Assumption #5 Linearity of independent variables and log odds

The fifth assumption is that logistic regression will assume linearity of the independent variables and log odds. To test this assumption the Box-Tidwell procedure is used (see appendix E for SPSS output). This procedure includes computing the Ln of the independent variables. This is done through SPSS. Next, the interaction between the independent variable and its Ln is added to the model. If the P-value is significant it is a sign of non-linearity of the independent variable and log odds. The output is provided underneath. Three of the interactions are significant indicating a violation of this assumption. A Bonferroni correction was applied. Adjusted alpha level = original alpha level / number of comparisons. Which means 0.05 / 14 = significant P < 0.0035. Even with this correction similar results are found (Tabachnick & Fidell, 2014). Another alternative is to go polynomial which means computing independent variable * independent variable and include it in the model (deleting the Ln variables). Also, this method results in identical outcome. Concluding that tenure, amount of schools and FTE does not comply to the linearity assumption.

Because the linearity assumption is violated the independent variables were further investigated by checking for outliers (via boxplot, normal distribution graph, Zscores and Cook's distance). Issues where found in normal distribution of Age, Tenure, FTE, Number of contracts, Amount of schools. The main issue is that there is a difference between teachers that have a fixed contract and those who substitute other teachers. This has a major effect on: FTE, Number of contracts and Amount of schools. Therefore, these continuous variables were recoded into groups. The variable age and tenure are both not normal distributed. The variable age has a peak in teachers from 20 to 40 years followed by a decrease in teachers to roughly the age of 50 and then starting to increase again. The peak in younger teachers might be explained as a result of the measurements of the Dutch government to increase the attractiveness of teaching. Either way, the variable age is recoded into groups. The distribution of tenure peaks at teachers with less than 5 years of experience. Multiple studies on teacher turnover find that a large group of beginning teacher leaves the profession within 5 years. Therefore, it can be explained why the group tenure <5 years of experience is much larger. This variable is also recoded. The table underneath provides an overview of the recoded variables and its groups. After adding them into the model the model does not violate the assumption anymore. Table 3 provides an overview of the independent variables that are recoded.

Table 3 | Overview independent variables that are recoded

Independent variable	**Groups**
FTE	=< .5 Fte
	> .5 Fte
Number of contracts*	=< 3 contracts

	> 3 contracts
Amount of schools	1 school
	More than 1 school
Age**	<= 30 years
	30-50 years
	50+
Tenure	<= 5 years
	5-10 years
	10-15 years
	>15 years

Note.

* 3 is the mean number of contracts of teachers in this dataset, these include contract to temporary substitute a teacher of a different school.

** The groups are divided based on reports from for example CentreData which makes it easier to compare results.

Chapter 4

Results

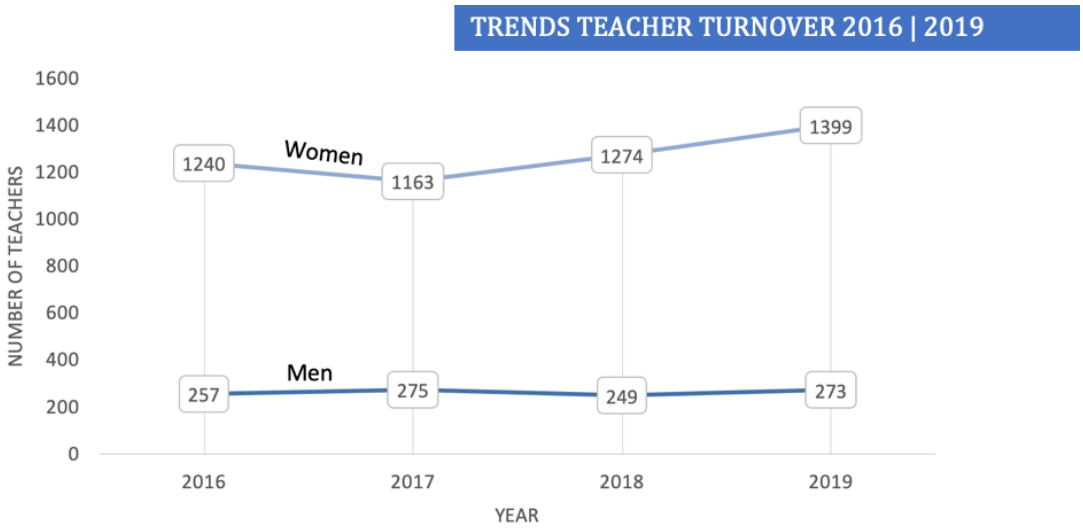
This chapter will present the results of this research. It describes the steps taken in the process of analyzing the multiple variables and their effect on employee turnover. This research will combine multiple datasets with each other to be able to test the models proposed in the theoretical chapter. The primary objective of the study is to examine which variables predict teacher turnover. This chapter begins with an overview of the most important trends on teacher turnover 2016 to 2019. This was asked by the company to include this in the research to have a broad idea about teacher turnover. The second part of this chapter will include assessing the model from chapter 3. The method that is used is binary logistic regression. The results that will be described here act as foundation for the conclusions and recommendations in the next chapter.

4.1 Part one: teacher turnover trends in the Netherlands 2016-2019

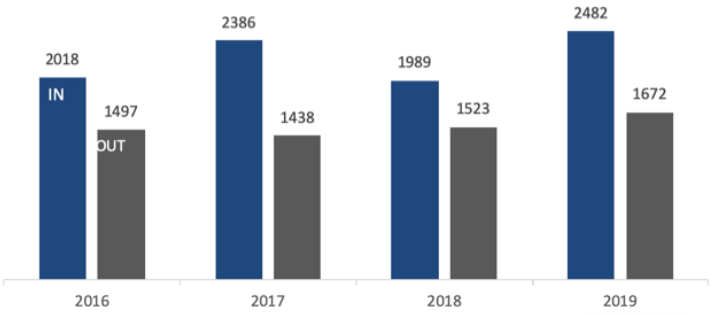
Over the last four years women tend to leave the school more often than men. In the last three years women have an increase in teacher turnover. This finding is not strange because the dataset consists largely of women. Indicating that the role of a primary teacher is in the Netherlands dominated by women. Teacher turnover was highest in the year 2018 and lowest in 2017. The percentage lays between 32,9 and 38,3 percent. This includes also temporary work. This could be the reason why this percentage is that high. When looking at teacher inflow and outflow, the number of teachers coming in are more than teachers that leave. This is a positive sign because this means that there are more teachers filling the "teacher shortage gap". When looking at the mean age of teacher per year it is slightly increasing. This is not a good sign since this means that younger teachers are leaving. When zooming in on the average age of a teacher per year the same trend can be identified. This could be explained that for example by the increasing teachers that are near their retirement age. These findings are consistent with the expected "U-relationship". Teachers in the beginning of their career tend to leave faster but also near the end of the career (Billingsley & Bettini, 2019). Although not every region in the Netherlands is represented, the higher teacher turnover is in Noord-Holland and in Utrecht. Teacher turnover is near 50% which sounds a lot but also includes the temporary work. Lastly, for a portion of the dataset a reason of leaving the school is included. The biggest reason for leaving is

end of contract (also verifying the temporary contracts). It is interesting that the second most mentioned reason of leaving is voluntary. This is important to know because this means that schools have influence on the intention to leave. Unfortunately, the data does not dive further in the real reason why a teacher left. This would have been valuable information.

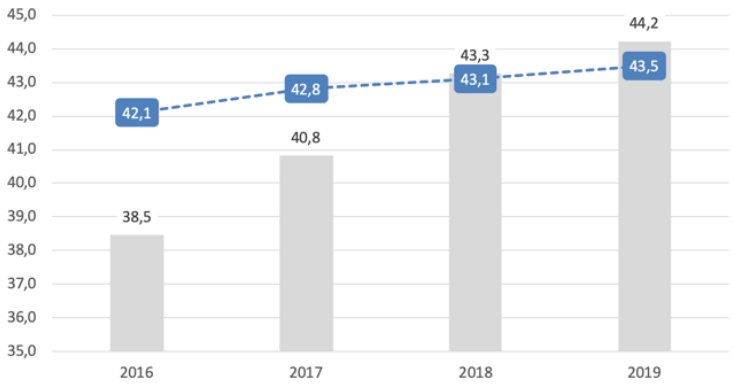
To conclude, teacher turnover is increasing, more women than men are employed as primary teacher. Furthermore Noord-Holland and Utrecht have the highest percentage of teacher turnover. the most mentioned reason to leave is end of contract followed by voluntary leave. Lastly, the mean age of teachers increases as well as the mean teacher that leave.



INFLOW AND OUTFLOW PER YEAR

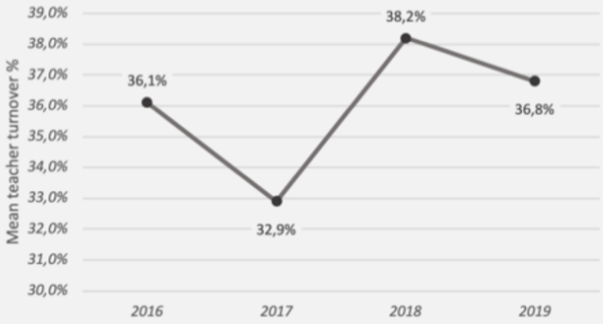


MEAN AGE OF TEACHER TURNOVER PER YEAR AND MEAN AGE OF TEACHERS PER YEAR

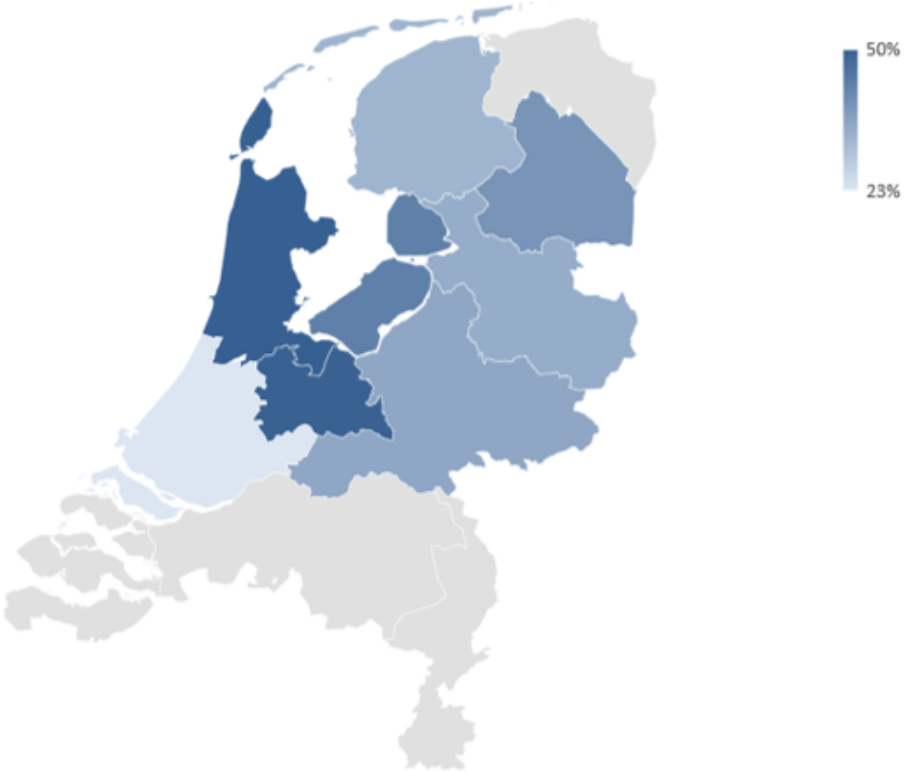


TEACHER TURNOVER PER CATEGORY

TEACHER TURNOVER PER YEAR



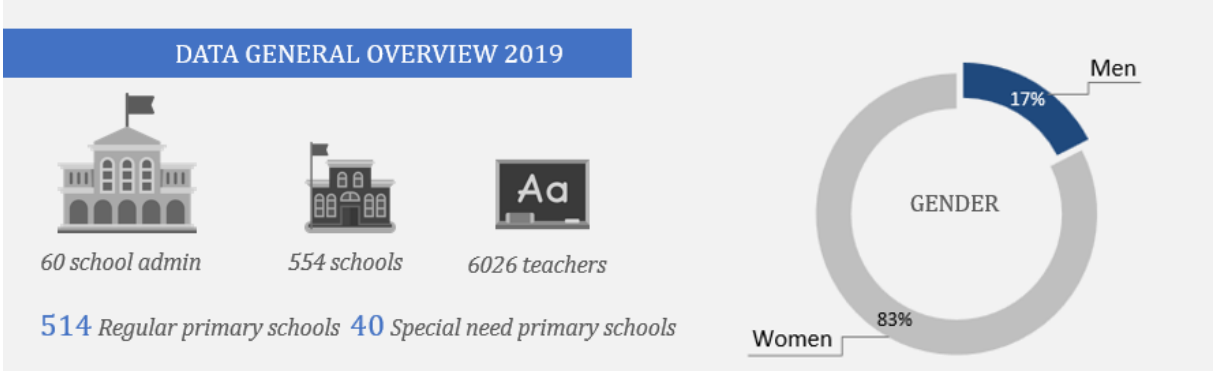
TEACHER TURNOVER PER REGION LAST FOUR YEARS



4.2 Part two: predicting teacher turnover one level

Results differ based on applied assumptions. Purpose of conducting the logistic two times is to show the impact on the choice of assumptions. Because of this the results are indeed sometimes contradicting. Indicating assumptions impact the results a lot.

Descriptive



The dataset that was used is of 2019. The dataset consists of 60 school administrations across the Netherlands. Schools that are included are from the regions: Friesland, Overijssel, Drenthe, Groningen, Flevoland, Noord-Holland, Gelderland, Utrecht and Zuid-Holland. In total the number of schools in this research is 554. Of those schools 514 are general schools and 40 special needs schools. In the Netherlands primary schools are based on certain norms and values. They are the religious affiliation of a school. Most schools are Protestant Christian, public or Roman Catholic. The total number of teachers are 5993. When looking at the gender of the teachers, as expected, there are far more female teacher than male teachers. Male teachers make up only 17% of the dataset. In the Netherlands teachers are aging. 20-35 N=1507, 35-49 N=2356, 50-65 N=2028 and 65+ N= 135. There are more teachers older than 40 years (N=3594) than below 40 years (N=2432).

Table 4 | Discriptives variables included in model

	Mean	Std	N
1 Turnover_teacher	1.12	.329	5993
2 Age	44.31	11.610	5993
3 Tenure	8.56	7.023	5993
4 Amount_schools	1.20	.517	5993
5 AantalAanstellingen_2019	3.35	3.444	5993
6 Loon_2019	44,202.79	19,545.12	5993
7 Fte_2019	.54	.31	5993
8 Gender	1.87	.333	5993

Table 5 | Pearson correlation matrix

	Turnover_ teacher	*Age*	*Tenure*	*Amount_ schools*	*Aantal Aanstellingen _2019*	*Loon_ 2019*	*Fte_ 2019*
1 Turnover_teacher	1.00						
2 Age	.00	1.00					
3 Tenure	-.12**	.41**	1.00				
4 Amount_schools	-.03*	-.01	-.08**	1.00			
5 AantalAanstellingen_2019	-.12**	.04**	-.04**	.35**	1.00		
6 Loon_2019	-.49**	.16**	.17**	-.39**	-.16**	1.00	
7 Fte_2019	-.04**	-.25**	-.11**	-.17**	-.32**	.37**	1.00

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

First analysis

Table 6 | Assessing model fit

	-2 Loglikelihood	*Cox & Snell R square*	*Nagelkerke R square*	*Hosmer and Lemeshow test*
Model fit	1883.07	.350	.666	.114

Table 7 | Baseline model (block 0) constant

	Coefficient	*Wald statistic*	*P*	*Odds*
Constant	-1.968	2496.62	<0.001	.140

Assessing the overall model fit

The output of SPSS starts with showing the null-model. This model is our basic model without the independent variables (table 4). The goal is that our 'new' model, including independent variables, will perform better than the null model (see table 3). This is tested via the Hosmer Leweshow test. This test indicates a p = .114, showing non-significance. Non-significance indicates that this model is significantly better than the null model (the predicted value without the independent variables) indicating a good fitting model. In the binary logistic regression, the dependent variable is dichotomous. Group 1 is the base group consisting of teacher that stay and group 2, the group we are interested in, include the leavers. The accuracy percentage of the new model is 66,4 per cent (table 5). The model is able for more than 65 per cent to correctly identify and categorize teacher that leave. Percentage of correct predicted "stayers" is very high, 98,3%. The model does an even better job at predicting who will stay. To further assess the fit of the model the Cox & Snell and Nagelkerke pseudo R-squared will be interpreted. Although they include the name "R-squared" they are not identical as R-squared in the sense that this exact number represents the variability in the dependent variable accounted for by the predictor. This makes them difficult to interpret. Cox and Snell R^2 = .350 and Nagelkerke R^2 = .666. There are some discussions around which R-square to use. Most prefer

Nagelkerke because of the fact that the upper bound has a limit, namely 1 which makes it easier to interpreted. Nagelkerke R^2 suggests that the proposed model is roughly explaining 66 per cent of the variation in the outcome. Which is almost the same as the accuracy percentage of the model given in the output of the classification table. To conclude, based on the above measures the overall model fit is good.

Table 8 | Classification matrix predicting teacher turnover

		Teacher turnover		
		No	Yes	Total percentage correct
Teacher turnover	No	5166	92	98.3
	Yes	247	488	66.4
				94.3

Note. The cut value is .500

Assessing the individual predictors

Knowing that the overall model is good, the next step is assessing the model fit in terms of individual predictors. The binary logistic regression predicts whether or not a teacher has a higher or smaller chance to leave. The output tells us about the change in the logit of the outcome variable when the predictor variable changes with one-unit (discovering statistics). Second, the output provides the Wald statistic. The Wald statistic tests whether or not the *b* coefficient of the specific predictor is significantly different from zero (discovering statistics). When there is a significant difference the predictor is contributing significantly to the outcome (teacher turnover). The odds ratio in SPSS is referred to as Exp(B). If this value is larger than 1 it means that the predictor increases the odds of the outcome (teacher turnover). Opposite direction indicates a decrease in the odds of the outcome occurring. All the included variables are: salary, gender, number of contracts, amount of schools, FTE, tenure and age (see table 5).

Gender has a positive change in odds, b = .276, Exp(b) = 1.318. Because it is a dichotomous variable (men 1 and women 2) it indicates that women have a higher change of belonging to the teachers that leave. But this finding is not significant because Wald statistic is indicating non-significance p = .176.

Age has a positive change in odds, b = .074, Exp(b) = 1.077. It indicates that the higher the age, the higher the odds that the teacher belongs to the target group (the leavers). The Wald statistic is significant p = <0.001.

Tenure has a negative change in odds, b = -.051, Exp(b) = .950. It indicates that the higher the tenure, the lower the odds that the teacher belongs to the target group (the leavers). The Wald statistic is significant p = <0.001.

Amount of schools has also a negative change in odds, b = -2.935, Exp(b) = .053. It indicates that the more schools a teacher is employed, the lower the odds that the teacher belongs to the target group (the leavers). The Wald statistic is significant p = <0.001.

Number of contracts has also a negative change in odds, b = -.169, Exp(b) = .845. It indicates that the more contracts a teacher has, the lower the odds that the teacher belongs to the target group (the leavers). The Wald statistic is significant p = <0.001.

Salary (Loon_2019) has also negative change in odds, b = -4.123, Exp(b) = .016. It indicates a strong decrease of odds that the teacher belongs to the target group (the leavers) when earning a higher salary. The Wald statistic is significant p = <0.001.

Fte has also a positive change in odds, b = 5.522, Exp(b) = 250.159. It indicates that the more hours a teacher works per week, the higher the odds that the teacher belongs to the target group (the leavers). The Wald statistic is significant p = <0.001.

Table 9 | Logistic regression output inserting all variables

	Coefficient	Wald statistic	P	Odds
Gender	.276	1.829	.176	1.318
Age	.074	137.907	<.001	1.077
Tenure	-.051	25.458	<.001	.950
Amount_schools	-2.935	277.705	<.001	.053
AantalAanstellingen_2019	-.169	37.212	<.001	.845
Loon_2019	-4.123	753.110	<.001	.016
Fte_2019	5.522	229.150	<.001	250.159
Constant	-6.210	217.668	<.001	0.002

Second analysis

Table 10 | Assessing model fit

	-2 Loglikelihood	*Cox & Snell R square*	*Nagelkerke R square*	*Hosmer and Lemeshow test*
Model fit	1982.14	.339	.645	.842

Table 11 | Baseline model (block 0) constant

	Coefficient	*Wald statistic*	*P*	*Odds*
Constant	-1.968	2496.62	<0.001	.140

Assessing the overall model

The null model is shown in table 11. The model has a good model fit based on the Hosmer Leweshow test. This test indicates a p = .842, showing non-significance. The accuracy percentage of the new model is 63,5 per cent. The model is able for more than 63 per cent to correctly identify and categorize teacher that leave. Percentage of correct predicted "stayers" is very high, 98,2%. The model does an even better job at predicting who will stay. Cox & Snell and Nagelkerke pseudo R-squared also provide a good indication of model fit. Cox and Snell R^2 = .339 and Nagelkerke R^2 = .645. Nagelkerke R^2 suggests that the proposed model is roughly explaining 63.5 per cent of the variation in the outcome. Which is almost the same as the accuracy percentage of the model given in the output of the classification table. To conclude, based on the above measures the overall model fit is good.

Table 12 | Classification matrix predicting teacher turnover

		Teacher turnover		
		No	Yes	Total percentage correct
Teacher	No	5164	94	98.2
turnover	Yes	268	467	63.5
				94.0

Note. The cut value is .500

Assessing the individual predictors

Knowing that the overall model is good, the next step is assessing the model fit in terms of individual predictors. The binary logistic regression predicts whether or not a teacher has a higher or smaller chance to leave. The output tells us about the change in the logit of the outcome variable when the predictor variable changes with one-unit (discovering statistics). Second, the output provides the Wald statistic. The Wald statistic tests whether or not the *b* coefficient of the specific predictor is significantly different from zero (discovering statistics). When there is a significant difference the predictor is contributing significantly to the outcome (teacher turnover). The odds ratio in SPSS is referred to as Exp(B). If this value is larger than 1 it means that the predictor increases the odds of the outcome (teacher turnover). Opposite direction indicates a decrease in the odds of the outcome occurring. All the included variables are: salary, gender, number of contracts, amount of schools, FTE, tenure and age.

Salary has a negative change in odss. The variables change in odd is B = -3.708 and Exp(B) =0.025. For every increase in salary the changes of belonging to the teachers that leave it decreases. With an α = 0,05 the Wald statistic is significant p = < 0,001. The variable Salary_logodds indicates non-significance which violates the assumption of linearity in log odds. This findings should be intrepeted with great care.

Gender has a positive change in odds. The change in odd is B=0.553 Because it is a dichotomous variable (men 1 and women 2) it indicates that women have a higher chance of belonging to the teachers that leave. Exp(B) = 1.739 which is above one indicating the same result. Wald statistic is significant p = .008.

Number of contracts (REC aanstelling) has also a positive change in odds. This variable is dichotomous (=<3 and >3). Exp(B) = 3.264 and B=1.183 which are both above one. The group of teachers that have more than 3 contracts have a higher chance of belonging to the teachers that leave. Wald statistic is significant p = < 0,001.

Amount of schools (REC_amount) has a positive change in odds with B = 3.892. The variable consists two groups (1 school or more schools). Exp(B) = 49.020 which is high above one indicating that teacher that teach on more than one school have a higher chance of belonging to the teachers that will leave. Wald statistic is significant p = < 0,001.

FTE has a negative change in odds of B = -1.881. The variable includes two groups (=<.5 Fte and >.5Fte). Odds ratio is below 1 Exp(B) = .152. The group that works equal to or less than 5 Fte have a higher chance of belonging to the teacher that leave. Wald statistic is significant p = < 0,001.

Tenure is coded into three dummy variables. The reference group is >15 years of tenure. The first dummy variable compares the reference group >15 (coded 0) and <=5 years tenure (coded 1). The chance in odds is positive and odds ratio is above 1 (b = .428, Exp(B) = 1.534). Indicating that the group <=5 years have a higher change of teacher turnover than the reference group. Wald statistic is

significant p = .016. The second dummy variable compares the reference group (coded 0) and 5-10 years tenure (coded 1). The chance in odds is negative but the finding is not significant p => .05. The last dummy variable compares the reference group (coded 0) and 10-15 years tenure (coded 1). The chance in odds is positive but the finding is not significant p => .05.

Age is coded into two dummy variables. The reference group is 50+. The first dummy variable compares the reference group 50+ (coded 0) and <=30 year (coded 1). The chance in odds is negative and odds ratio is below 1 (b = -1.077, Exp(B) = .341). Indicating that the group 50+ have a higher chance of teacher turnover than the comparison group. Wald statistic is significant p =<.0001. The second dummy variable compares the reference group 50+ (coded 0) and 30-50 year (coded 1). The chance in odds is negative and odds ratio is below 1 (b = -.995, Exp(B) = .370). Indicating that the group 50+ have a higher change of teacher turnover than the comparison group. Wald statistic is significant p =<.001.

Table 13 | Logistic regression output inserting all variables

	Coefficient	Wald statistic	P	Odds
Gender	.553	7.109	.008	1.739
Age (50+*)		53.00	<.001	
Age <=30	-1.077	28.662	<.001	.341
Age 31-50	-.995	49.068	<.001	.370
Tenure (>15*)		18.105	<.001	
Tenure <= 5	.428	5.771	.016	1.426
Tenure 6-10	-.352	2.052	.152	.704
Tenure 11-15	.027	.210	.898	1.027
Amount_schools	3.892	297.747	<.001	49.020
AantalAanstellingen_2019	1.183	56.477	<.001	3.264
Salary	-3.708	433.804	<.001	.025
Salary_logodds	-.105	.118	.372	.900
Fte_2019	-1.881	142.431	<.001	.152
Constant	-5.967	22.911	<.001	.003

Note. * = the reference group

4.3 Discussion comparing both logistic regressions

Results and outcomes are contradicting. This demonstrates that applying different assumptions lead to different outcomes.

The result of the two binary logistic regression showed different outcomes. Indicating that Ottenbacher et al. (2004) has a valid point that using different assumptions lead to different outcomes and if these results can be trusted. This thesis research aimed to raise this issue by conducting two analysis. The overall fit where both good and the percentage of corrected predicted cases was for both models between 60 and 65 percent. There are differences depending on which assumptions are applied. This section will compare the results. In table 14 a summary of the conclusions for each hypothesis per analysis are included. Table 15 provides a summary of the rejected hypotheses per analysis.

Gender

The first and second analysis show identical results but difference in significance. Both show that women tend to have a higher chance of teacher turnover. In the first analysis gender was not significant and thus rejecting the hypothesis. While the second analysis shows significance and confirms the hypothesis. This could be explained by the decrease in continuous variables of the second analysis. The second analysis show that women are 1.7 times more likely to belong to the teacher turnover group. This could be explained because there are far more women than men in the dataset, so it is not surprising that women tend to leave more often. In literature the amount of evidence is mixed.

Age

Both analyses show that age has a significant impact on teacher turnover and therefore confirms this hypothesis. The first analysis finds that the older the teacher the higher the chance of teacher turnover. The second analysis provides more nuance. Teachers that belong to the category 50+ have a higher chance of teacher turnover.

Tenure

Both analyses show that teachers that are longer in the same position will have a higher change of staying. This confirms the hypothesis. The second analysis found a significant difference between teachers that have 5 years or less tenure and those have a tenure of longer than 15 years. Teachers with 5 years or less tenure have a 1.4 times higher chance of leaving. Another explanation is that in the "<5 group" probably include the beginners as well which have per definition a higher chance of teacher turnover (Billingsley & Bettini, 2019). It should also be considered that this group also includes the teachers that have a temporary contract.

Amount of schools

The results of this predictor are contradicting. The first analysis shows that teacher working on multiple schools have a lower chance of teacher turnover. While the second analysis finds the exact opposite. Based on literature and logical reasoning the results of analysis 2 is more logical. It can be explained that a high amount of schools indicates a lot of temporary work and/or replacement work. It is known that substituting a teacher is often felt as extra stressful. Furthermore, working on multiple schools means constantly switching from children, schools, culture and attending extra school activities (e.g. parent conversations, extra administrative tasks, school trips etc.).

Number of contracts

This predictor also shows contradicting results among the two analysis. The hypothesis is that the higher the number of contracts the higher the chance of teacher turnover. The first analysis rejects this hypothesis and while the second analysis confirms the hypothesis. Again, the second analysis is more logical based on literature and common knowledge. A high number of contracts indicate a lot of temporary work on multiple schools.

Salary

First analysis shows that the higher the salary of a teacher the lower the chance of teacher turnover. This finding is significant and confirms the hypothesis. The second analysis shows similar results. But

when testing for linearity of log odds, salary does violate this assumption. The findings are consistent with literature (Billingsley & Bettini, 2019; Carver-Thomas & Darling-Hammond, 2019). Although the findings and literature are similar, the fact that the assumption was violated means that this should be interpreted with care.

FTE

This last predictor has also some mixed findings. The first analysis reports that the higher the number of FTE the higher the chance of teacher turnover. This finding is significant and rejects the hypothesis. In this model FTE was included as continuous variable. In the second analysis FTE was recoded in groups. The effect is rather small but the teacher that work =< .5 FTE show a significant increase in odds of teacher turnover. Reasoning with common sense it would be logical that teacher with lower FTE will leave faster because of the limited workhours. This could also be an indication of temporary work or substituting teacher. Based on literature it could be that small amount of FTE reflects the limited opportunities for career development. Although the literature is consistent with the finding of the second analysis, this does not explain the contradicting finding of the first analysis. Therefore, more research is needed.

Table 14 | Summary hypotheses and outcomes per analysis

Hypotheses	*Analysis 1*	*Analysis 2*
Gender significantly impacts teacher turnover	Gender is not significant.	Women significantly higher odds of leaving
Teacher near their retirement will have a higher chance of teacher turnover	Higher age higher change of leaving	- 50+ higher higher likelihood of leaving compared to <= 30 years - 50+ higher higher likelihood of leaving compared to 30-50 year old
Teachers with higher tenure will have a lower chance of leaving	Higher tenure lower change of leaving	- Group that have 5 years of less tenure higher likelihood of leaving than group >15 plus years - 5-10 years not significant - o 10-15 years not significant
The higher the number of schools a teacher is employed, the higher the chance of teacher turnover	Teachers that work on more than 1 school lower likelihood of leaving	Teachers that work on more than 1 school higher likelihood of leaving
The more contracts a teacher has (indicating temporary work or replacement work) the higher the chance of teacher turnover	Higher number of contracts lower likelihood of leaving	More than 3 contracts higher likelihood of leaving

The higher the salary the lower the chance of teacher turnover	Higher salary lower chance of leaving	Higher salary, less likelihood of leaving but violating assumption
Teachers with less hours in a workweek (FTE) higher chance of teacher turnover	Higher FTE higher chance of leaving	Teachers that work <= .5 have higher likelihood of leaving

Table 15 | Summary rejected hypotheses per analysis

Hypotheses	*Analysis 1*	*Analysis 2*
Gender significantly impacts teacher turnover	Rejected*	Confirmed
Teacher near their retirement will have a higher chance of teacher turnover	Confirmed	Confirmed
Teachers with higher tenure will have a lower chance of leaving	Confirmed	Confirmed
The higher the number of schools a teacher is employed, the higher the chance of teacher turnover	Rejected	Confirmed
The more contracts a teacher has (indicating temporary work or replacement work) the higher the chance of teacher turnover	Rejected	Confirmed
The higher the salary the lower the chance of teacher turnover	Confirmed	Confirmed **
Teachers with less hours in a workweek (FTE) higher chance of teacher turnover	Rejected	Confirmed

Note. * = showed no significance

** = violates assumption

Chapter 5
Discussion and conclusion

After a literature review, and using multiple databases, this research intended to increase understanding of teacher turnover in primary school in Dutch context. The research question is: what are characteristics that contribute to predicting teacher turnover of primary schools in the Netherlands? The model that was tested among 5993 teachers included: gender, age, tenure, salary, FTE, number of contract and amount of schools.

The first finding is regarding *gender*. The first analysis shows that women have a significant higher chance of teacher turnover than men. This finding should be interpreted with great caution. Firstly, the second analysis does not verify this result and secondly the data is skewed since 80% is women. Grissmer and Kirby (1987) and Richard M Ingersoll (2001) show that turnover rates differ based on gender. But more recent studies like Allen, Burgess, and Mayo (2018) and Billingsley and Bettini (2019) concludes the opposite, and finds that gender becomes insignificant predictor. Other studies try to explain why there is a difference in gender. In other studies the influence of perceived work-related stress does explain the difference in gender (Klassen & Chiu, 2010).) Antoniou, Polychroni, and Vlachakis (2006) and Klassen and Chiu (2010) find that female teachers in general experience higher levels of work related stress than male teachers. Unfortunately, with the current dataset this cannot be verified in this research. Given the mixed findings in literature, the analysis and knowing that the dataset mainly consists of women, the generalisation of the outcome should be interpreted with care. This finding verifies the mixed findings in literature and adds to the discussion whether gender is a good predictor or not. Which is in this case should be interpreted with caution.

Second important finding is the impact of *age* on teacher turnover. It is found that the higher the age the higher the chance of teacher turnover. It confirms the finding in literature. On the other hand, it was also expected to find a so-called "U-relationship" (Allen et al., 2018; Billingsley & Bettini, 2019). It was surprising to find that younger teachers not showing a higher chance of teacher turnover. It is possible that young teachers have high chance of teacher turnover but older teachers have an even higher chance of turnover.

The third finding is that *tenure* impacts teacher turnover. Although the years of experience is often used as a predictor, the variable tenure is not often used in research. This thesis therefore contributes to the literature by adding this variable. It could be explained by the longer someone is in the job the more used someone is to for example the demands of the job. van der Want et al. (2019)

found that teacher who are longer on the job have more belief is their capabilities. Richardson, Alexander, and Castleberry (2008) state that an individual with higher tenure have more experience and can therefore better control their emotions. In literature the more experienced teachers have a lower chance of teacher turnover. Therefore, it is expected that the teachers who are longer in the same job, have more experience and thus a lower chance of teacher turnover. Both analyses confirm this hypothesis.

Not only in literature (Billingsley & Bettini, 2019; Carver-Thomas & Darling-Hammond, 2019) but also in the newspapers there is a lot of attention for the monetary reward of teachers. Teachers complain about the low *salary* and therefore it is expected that a higher salary increases the chance of retaining teachers. Although the first analysis shows a significant relationship, the second analysis violates the assumptions. Both analyses verify that monetary reward is important, also in Dutch context. Nevertheless, the assumption in the second analysis was violated and thus this finding needs to be interpreted with caution.

In this thesis research two analysis were conducted. This turned out in some contradicting findings regarding: FTE, working on multiple schools and having multiple contracts.

The first analysis reports that the higher number of working hours (FTE) lead to a higher chance of leaving. The result of analysis 1 could be explained by the dominant presence of women in schools. In general women tend to prefer part-time because of the possibility to combine work and caring for their own children. Furthermore, the workload of teachers is known to be highly demanding. It could be that a teacher works part-time on paper but almost full time in practice. Which could hypothetically mean that teachers with a higher amount of FTE have more workload, more stress, and have a higher chance of teacher turnover. This finding contributes to the importance of the size of the contract (workhours) that could predict teacher turnover. The results of analysis 1 are somewhat counterintuitive since based on literature one expects to find the opposite. A small amount of FTE reflects the limited opportunities for career development. As van der Want et al. (2019) and the report of Berenschot (2018) show that this is an often-heard reason why teachers leave. Therefore, it was expected that teacher that work less hours have a higher chance of leaving. This finding should be future investigated.

Regarding number of schools employed and number of contracts some interesting findings will now be discussed. There is a lot of literature about beginning teachers and their increased chance of teacher turnover. But not so many literatures regarding the teachers that work on multiple schools and the "substituting" teachers. This master thesis contributes to the literature by exploring the effect of working in *multiple schools* and having *multiple contracts*. Based on literature it is expected that teachers that do a lot of substituting work have more stress than 'the regular' teachers. Additionally, when teacher work in multiple schools they have more workload because they have to attend different activities per school and need constantly switching between classes. Smith and Ingersoll (2004) show in their study that teachers have a higher change of leaving when their first job as part-timer or as long-term substitutes. A Study (Rundall & Terrell, 1985) describe that students often experience a shock when there is suddenly an unknown authority figure in front of the class. Substitute teacher have the difficult task to gain trust and develop a view of them as good quality teachers (Duggleby & Badali, 2007). This has many reasons for example that the environment is new, the culture is new, the children are unknown to the teacher and under these circumstances it is expected form the substituting teacher

to deliver identical quality as the "normal" teacher (Duggleby & Badali, 2007). Therefore, it is expected that the more contracts and the more schools a teacher is employed the higher the chance of teacher turnover. This hypothesis is confirmed by analysis 2 but rejected by the first analysis. The only possible explanation is that teacher working on multiple schools are more flexible employable. Because of their flexibility and because of the shortage of teachers this could imply that there is enough work for them which decrease the chance of teacher turnover.

5.2 Limitations of this study

During the process of this thesis multiple issued arose. This has impacted the research and will be described in this section as limitations.

The first limitation is that it was intended to include "HR" data in the model but due to issues with the provider it was not feasible to include it. Therefore, the logistic regression does not represent the whole picture of teacher turnover. Also, the data from CBS that includes variables of school characteristics are in the end not included in the model. This was because of the inconsistency of the data and a lot of missing values. Adding these variables would only result in results that could be doubtful. Thus, be aware of this issue when applying these outcomes

The second limitation was that the outcomes of the logistic regression is not representative for the Netherlands as a whole. This is because data form the south of the Netherlands is not included in the sample size since the company has no data of them. In future studies it would be interesting to have an evenly distributed sample of the amount of schools per region.

Thirdly, it is interesting that in the second analysis the assumption of linearity in log odds was not met by the variable salary. This should be further investigated why this is. It is recommended to collect more evidence to be able to conclude something on this predictor. To continue the argument of assumptions in logistic regression, the results in this study are impacted by that. This demonstrates that it has a large impact on the outcomes, therefore more research is not only needed on teacher turnover but on the topic of binary logistic regression. Because this method has some contradicting discussion about the use of assumption the limitation is that the question arises regarding the trustfulness of the research outcomes. Not only in this study but also others that have used or are using logistic regression.

Fourth, it is important to note that this research also included teacher with a temporary contract or teacher that do a lot of substitution work. This could have impacted the results. Future research should make the distinction clearer.

5.3 Agenda for future research

This thesis contributes to the literature in multiple ways. First of all, the scope of teachers is not only restricted to beginning teachers. Lots of literature is specified for beginning teachers. It is important to also look into the older teachers because a lot of them will be leave and this will cause knowledge loss. The insights of this research also contribute to the teacher turnover specifically in the Dutch context since studies in the Netherlands are scarce. Thirdly, not all proposed variables could be tested therefore this chapter will end with propositions for future research. These are based on the literature review. Besides these proposals it will be interesting to use a different approach in method. Qualitative data gives the opportunity to find underlying motives and reasons why teachers leave. It could be interesting for a PhD study to look into the differences over year, thus conducting a longitudinal study.

Additionally, a study of multiple levels provides more insights in teacher turnover. Because teachers are nested in schools and schools are nested in school administrations it is interesting to look for differences and similarities. Furthermore, a study that looks into the differences per region would be fruitful for a more differentiated approach. Another area could be the impact of HR practices or the effect of the principal and teacher turnover. Lastly, since teacher turnover is not often studied in the Netherlands it would be interesting to see how the concepts of employee turnover (as presented in the theoretical framework) impacts teacher turnover. To conclude, this research was meant as a basis for future research. To end with a personal note. I belief that there is still a lot to discover about teacher turnover in the Netherlands. This topic is very important since it is about the quality of education for the future generation.

Proposition 1 preparation and qualification impact teacher turnover.

H1 | Teachers that are qualified through the regular programme have a lower chance on teacher turnover than teachers from alternative programs.
H2 | Uncertified teachers have a higher chance of teacher turnover
H3 | Teachers that followed an induction programme have a lower chance of teacher turnover than teachers without such a programme.
H4 | Teachers with a mentor have a lower chance of teacher turnover than teachers without a mentor.
H5 | The more experience a teacher has the lower the chance of teacher turnover.

Proposition 2 Student characteristics impact teacher turnover.

H6 | The lower the level of a school SES the higher the chance of teacher turnover.

Proposition 3 Working conditions impact teacher turnover.

H8 | The higher the perceived demands of a teacher the higher the chance of teacher turnover.
H9 | The higher the perceived administrative support the lower the chance of teacher turnover.
H10 | The higher the perceived collegial support the lower the chance of teacher turnover.
H11 | The higher the salary the lower the chance of teacher turnover.
H12 | Teachers that are in the end of their pay-rate have a higher chance of teacher turnover.
H13 | The higher the perceived autonomy of a teacher the lower the chance of teacher turnover.
H14 | The more opportunities for teachers on professional development the lower the chance of teacher turnover.
H15 | The more perceived autonomy by a teacher the lower the chance of teacher turnover.

Proposition 4 Personal characteristics impact teacher turnover

H16 | Beginning teachers (teachers with less than 5 years of experience) have a higher chance of teacher turnover.
H17 | Teacher near their retirement (teachers with less than five years before retirement) will have a higher chance of teacher turnover.
H18 | The more the teacher has a person-organisation fit the lower the chance of teacher turnover.
H19 | The higher the level of self-efficacy of a teacher the lower the chance of teacher turnover.

One of the limitations is that teacher turnover literature is not yet researched a lot in the Netherlands. Therefore, it is unknown if the proposed conceptual model is also applicable to the Dutch context. Therefore, more research is needed. In chapter 2 the literature focused only on teacher turnover in international context. It could be that the conceptual model does not represent the full picture. Therefore, an additional literature review is conducted which can be found in appendix E. This literature review is a general overview of the history of turnover research. On the basis of employee turnover research are two concepts. Perceived ease of movement which is about how easy it is for someone to leave. And perceived desirability of movement which refers to the desire for someone to leave the current organisation. Later employee turnover was seen as forces that influence the turnover rates. More recent literature also acknowledges the role of HR. Throughout the years the amount of research and models increased. These models can be interesting to test in the context of teacher turnover.

Based on the comparison of the model of chapter two and the model of appendix E there are already some differences between the models. In this paragraph they are briefly mentioned. The first remarkable difference is that the teacher turnover model lacks the influence of the normative force. This force refers to what society thinks of the teacher profession as well as close friends or family.
The second difference is about the perceived ease of movement. This is about how easy it is to leave. This is influenced through extra organizational alternatives and the own professional network/visibility on the labour market. The third missing characteristic in the teacher turnover model is the effect of HR practices on teacher turnover.

The main argument here is that due to the lack of research in the Netherlands about teacher turnover, it is fruitful to use literature from employee turnover. Which is researched for more than 100 years. Future teacher turnover research could use these concepts to test if they are also applicable for teachers.

5.4 Practical implications

Whether you are working in a school administration, you are a school leader, a teacher, a parent or even a citizen in general, we all want the same for our children: high quality education. Because of the ongoing trend of teacher shortage, the quality of education is on stake. The main question how can the insights of this research help to attract and retain teachers?

Attract male teachers

One of the problems is a gender-gap. 80% of the database in this research consists of women. And it's not just this database. The same trend is seen among other countries across the globe. The lack of a strong male role-model brings the development of children in jeopardy. Another reason for attracting males is that it broadens the candidate pool. What can we do to help with this?

Cooperate on a nationwide level to create a better fit for men

A practical example in the Netherlands can be found in the technology work field. There was a shortage of well-educated technicians along with a large gender-gap. Men dominated the workplace. To find a solution, Techniekpact (2020) was born. They identified the motivations and needs for women, and compared them to the standards in the technical sector. They found out that women overall want to work part-time while most technical jobs where asking full-time employment. With

this insight, more part-time jobs were created. This is one of the many best practices of which the educational sector can take example of to close the gender gap.

Literature is also suggesting that working as a teacher are for those who are not drawn to becoming a 'career tiger'. Salary growth and job opportunities are often lacking in primary education. Enough reason for school administration and schools to discuss how to for example create more interesting career paths. Although the career path of a teacher in primary school is often fixed some opportunities lay in adding more responsibility (e.g. managing temporary projects).

What to be careful of

China has identical problems when it comes to gender gap in schools. Therefore, they introduced a policy in 2016: men starting a study in education no longer had to pay tuition. While women who pursued the same study had to pay the full tuition. This brought up a lot of criticism (Hernández, 2016). Thus, be aware of gender discrimination.

Save costs by retaining teachers with short tenure

Teacher-school fit

Via recruitment and strategical teacher planning there should be more emphasize on the teacher-school fit. This is important because working on a school in a large city requires a different personality/skill-set than in a small town. A school can define together with the school administration what type of teacher they search for. Which puts more emphasize on the personality than just fulfilling the task related requirements. In the recruitment process candidates should have a conversation with more teachers in the school to ensure the best fit.

Mentorships

After recruiting new teachers, it is important to provide enough guidance. This could be done via mentorships. The head of the school should provide the teacher with opportunities to provide honest feedback. For this to happen, psychological safety is of great importance. Otherwise teachers will not feel safe to share their thoughts and issues. A school leader could have trainings (provided by school administration) about this, for example about providing positive feedback and the growth mindset.

To have a frame of reference in these conversations a head of a school could apply the AMO-model. Ability (are the teachers lacking ability?) Motivation (what does motivate them?) opportunity (e.g. providing feedback moments in which teachers can openly talk about their skills and are given the time/possibilities for training).

Traineeships

Another suggestion is to attract new teachers by creating a traineeship programme. This will tackle the problem of the skills-gap and need of mentorship in the first year. A traineeship should therefore include: building up experiences in different classes from different schools, working on a variety of projects, one fixed day for training/self-development and a coach/mentor. The new teacher will be formed to the wishes and needs of the school (e.g. method, level of skills and experiences). Additionally, a traineeship is an attractive way to communicate to the labour market. It also helps to orient starting teachers on their new work field, making sure they can early on discover which facets of teaching they

(don't) like, possibly preventing them from leaving the work field after they encounter something later they dislike.

Save costs by retaining teachers with long tenure

This thesis research found that older teachers (especially 50+) have a higher chance of leaving (teacher turnover). Older teachers, in general, have more experience and thus valuable knowledge and skills for the school. This means that there is a lot of knowledge they take with them when they leave. To prevent teacher turnover, it is important to understand why this age group has a high turnover. What can help is to have regular conversations with them. It is important to identify why teachers near their retirement quit earlier than their retirement age. This can be done through conversations between head of the school and the teachers. These conversations can provide new insights for the school but also for the school administration. The output of these conversations can be used to possibly change their job into one that is more fitting with their needs, possibly retaining them for longer.

Fact based policies for reducing teacher turnover

Every school is different and therefore not all recommendations could be evenly useful and generalizable for individual schools. Therefore, it is needed that the school administrations put teacher turnover high on the agenda and collect their own data. This includes data based on surveys but also conversations with teachers and heads of schools. The survey should include the concepts of the proposed conceptual model in chapter 2. Based on the data, themes can be identified specifically applicable for a school administration. These themes should include actions and policies to decrease teacher turnover. After the implementation phase the impact is measured by again collecting data. This ensures the school administration of creating fact-based policies which will be applicable to their specific scenario. Collecting data about teacher turnover should be done structurally. Insights could be displayed in a dashboard for example. When multiple school administrations work with similar methods, the results can be even compared with each other to be able to perform a benchmark with similar schools.

5.5 Conclusion

Because of teacher shortages in the Netherlands in primary education, the quality of education is decreasing. In the Netherlands there is a limited amount of literature about teacher turnover which leads to a gap in literature regarding predictors of teacher turnover. It can be concluded that there is no unified model that predicts teacher turnover. This thesis research aimed to identify the characteristics of teacher turnover in primary education in the Dutch context. Although we are not there yet, the proposed conceptual model brings us a step closer to understanding teacher turnover in the Netherlands. A part of this model was tested with some interesting findings. An additional discussion was raised regarding the use of assumptions in logistic regression. This is important since this research demonstrates that applying different assumptions lead to contradicting results. Therefore, this thesis is also a call to researchers and practitioners in the Netherlands to put teacher turnover high on the agenda since it is impacting the quality of education.

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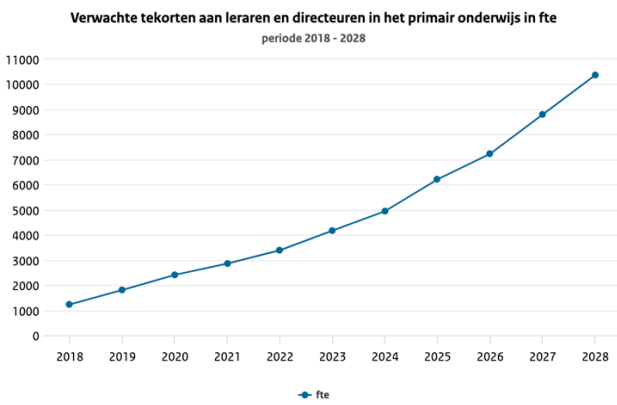
APPENDIX A | expected shortage of teachers (primary education) in the Netherlands

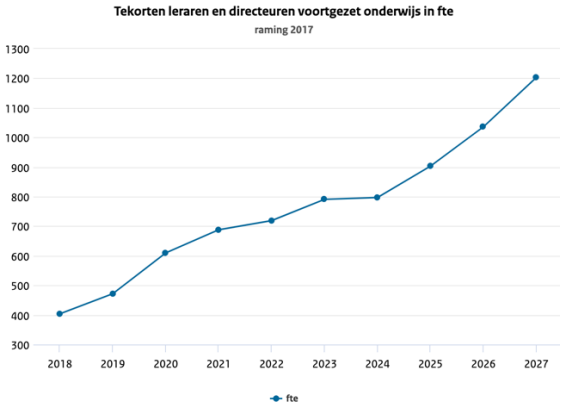


Verwachte tekorten aan leraren en directeuren in het primair onderwijs in fte

periode 2018 - 2028

	fte
2018	1231
2019	1808
2020	2409
2021	2859
2022	3391
2023	4172
2024	4948
2025	6217
2026	7235
2027	8801
2028	10370

APPENDIX B | expected shortage of teachers (secondary education) in the Netherlands

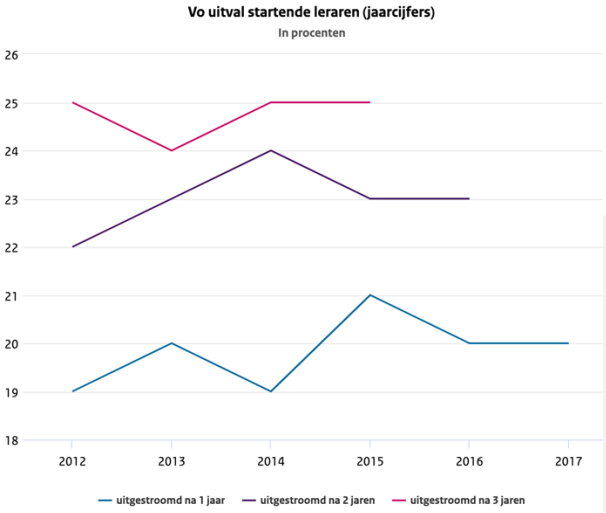


Tekorten leraren en directeuren voortgezet onderwijs in fte

raming 2017

Jaar	fte
2018	404
2019	472
2020	610
2021	688
2022	719
2023	791
2024	797
2025	903
2026	1036
2027	1203

APPENDIX C | teacher turnover (secondary education) in the Netherlands



Vo uitval startende leraren (jaarcijfers)

In procenten

	uitgestroomd na 1 jaar	uitgestroomd na 2 jaren	uitgestroomd na 3 jaren
2012	19	22	25
2013	20	23	24
2014	19	24	25
2015	21	23	25
2016	20	23	
2017	20		

APPENDIX D | Overview "solutions" teacher shortage

6) Aantal leerlingen, per provincie per oplossing

Kleurschaal is per rij (links-rechts), gegevens van afgelopen **12 maanden** in **Nederland** voor **groep alle groepen**

Provincie	Klas naar huis sturen	Verdelen over andere klassen	Parttimer komt extra dag terug	Gepensioneerde voor de klas	Werkdrukgelden-persoon voor de klas	Ouder met lesbevoegdheid voor de klas	Directie of IB-er etc	Onderwijsassistent of leraar-ondersteuner	Onbevoegde voor de klas (anders dan onderwijs-assistent	Invaller via detacheringsbureau	Tijdelijke inzet ZPP-er	Totaal
Zuid-Holland	5240	5877	7673	3171	20526	86	7862	9426	21886	9798	1330	92875
Antwerpen	25	-	-	-	-	-	-	-	-	-	-	25
Noord-Holland	8910	6983	14600	3478	13246	152	8182	3605	29316	2758	1001	92231
Limburg	1057	3813	3645	75	1668	138	727	189	2250	-	-	13562
Gelderland	2534	1701	1258	1119	23150	-	4515	4604	7997	862	27	47767
Noord-Brabant	2468	3609	7225	739	24043	97	1655	4792	4546	2201	-	51375
Overijssel	2096	1107	954	1041	16286	-	1496	2961	4255	339	-	30535
Utrecht	1714	1735	6563	751	5075	26	2084	1191	884	3965	369	24357
Friesland	792	470	2387	445	7031	39	322	1247	8502	675	-	21910
Groningen	2051	1042	980	-	15960	-	453	2978	2678	266	-	26408
Drenthe	1261	2717	427	-	6416	-	123	1336	1782	1023	-	15085
Zeeland	162	534	429	766	68	128	1029	134	3075	204	-	6529
Flevoland	1848	538	673	149	3609	522	435	660	5193	448	350	14425
Totalen	30.158	30.126	46.814	11.734	137.078	1.188	28.883	33.123	92.364	22.539	3.077	**437.084**

APPENDIX E | Testing assumption of log odds

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Gender(1)	-,192	,207	,853	1	,356	,826
	ZLoon_2019	-5,283	,490	116,373	1	,000	,005
	Ln_Loon by ZLoon_2019	,106	,048	4,810	1	,028	1,112
	ZAge	,234	,898	,068	1	,795	1,263
	Ln_age by ZAge	,147	,237	,382	1	,536	1,158
	ZAmount_schools	-3,220	,204	248,346	1	,000	,040
	Ln_Amountschools by ZAmount_schools	1,269	,102	155,602	1	,000	3,558
	ZFte_2019	2,553	,159	258,361	1	,000	12,852
	Ln_FTE by ZFte_2019	,668	,076	76,471	1	,000	1,951
	ZAantalAanstellingen_2019	-,640	,234	7,487	1	,006	,527
	Ln_Aanstellingen by ZAantalAanstellingen_2019	-,127	,119	1,133	1	,287	,881
	ZTenure	-1,095	,163	45,157	1	,000	,335
	Ln_Tenure by ZTenure	,515	,072	51,040	1	,000	1,674
	Constant	-5,838	,198	868,543	1	,000	,003

a. Variable(s) entered on step 1: Gender, ZLoon_2019, Ln_Loon * ZLoon_2019 , ZAge, Ln_age * ZAge , ZAmount_schools, Ln_Amountschools * ZAmount_schools , ZFte_2019, Ln_FTE * ZFte_2019 , ZAantalAanstellingen_2019, Ln_Aanstellingen * ZAantalAanstellingen_2019 , ZTenure, Ln_Tenure * ZTenure .

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Gender(1)	-,275	,204	1,824	1	,177	,760
	ZLoon_2019	-4,017	,156	660,233	1	,000	,018
	Loon2 by ZLoon_2019	,000	,000	,079	1	,779	1,000
	ZAge	,630	,163	14,980	1	,000	1,878
	Age2 by ZAge	,000	,000	1,116	1	,291	1,000
	ZAmount_schools	-1,981	,125	250,218	1	,000	,138
	Amount2 by ZAmount_schools	,012	,001	102,217	1	,000	1,012
	ZFte_2019	,774	,139	30,845	1	,000	2,169
	FTE2 by ZFte_2019	1,801	,222	65,888	1	,000	6,056
	ZAantalAanstellingen_2019	-,910	,110	68,327	1	,000	,402
	Aanstellingen2 by ZAantalAanstellingen_2019	,000	,000	2,213	1	,137	1,000
	ZTenure	-,547	,094	33,819	1	,000	,579
	Tenure2 by ZTenure	,001	,000	63,330	1	,000	1,001
	Constant	-5,241	,168	968,150	1	,000	,005

a. Variable(s) entered on step 1: Gender, ZLoon_2019, Loon2 * ZLoon_2019 , ZAge, Age2 * ZAge , ZAmount_schools, Amount2 * ZAmount_schools , ZFte_2019, FTE2 * ZFte_2019 , ZAantalAanstellingen_2019, Aanstellingen2 * ZAantalAanstellingen_2019 , ZTenure, Tenure2 * ZTenure .

APPENDIX F | LITERATUR REVIEW EMPLOYEE TURNOVER

This chapter is composed of two sections. The first part includes a brief overview of employee turnover literature. The second segment limits the focus solely on teacher turnover. The references for both literature reviews were based on sources from multiple databases; Web of Science, Google Scholar and Scopus. Key terms used for the general overview of employee turnover were; turnover, attrition, predictors, retention, antecedents, review and meta. Inclusion criterium was last 5 years. These databases were also used to search for teacher attrition. In addition to Dutch literature the journal "Pedagogische Studiën" was also reviewed. Key terms were; The Netherlands, primary education, PO, Dutch and Dutch translations of the terms above. Inclusion criteria were literature based on or research about primary education and conducted in the Netherlands.

2.1 Employee turnover literature review

2.1.1 Brief overview of employee turnover history

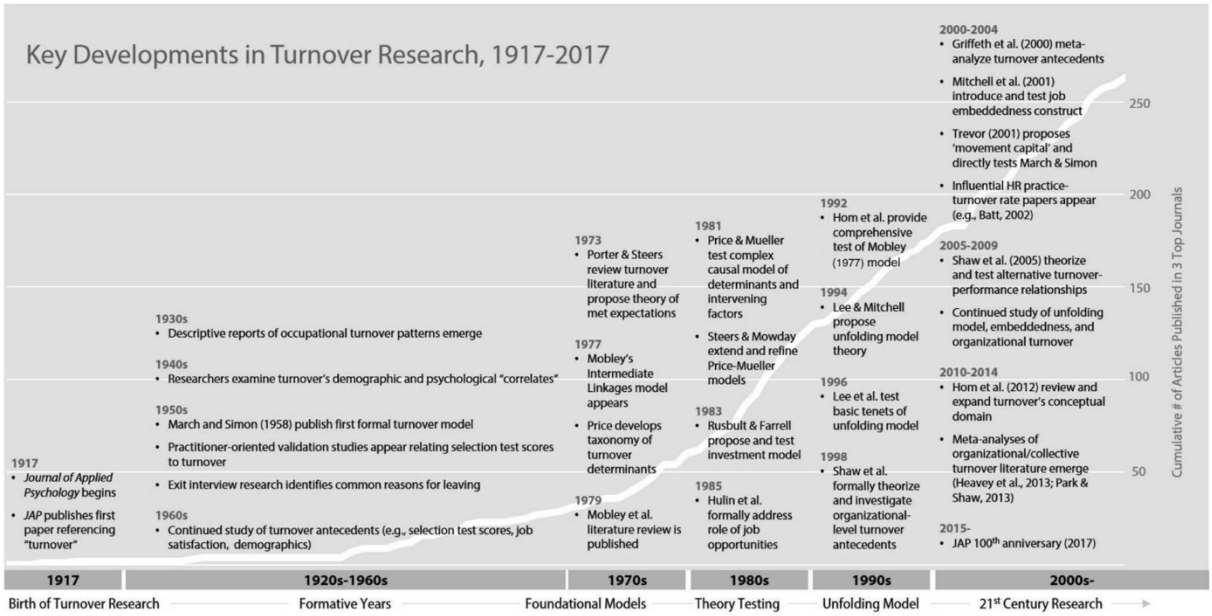


Figure 3 | Overview research timeline on turnover published in Journal of Applied Psychology, Personnel Psychology and Academy of Management Journal originally from Hom, Lee, Shaw, and Hausknecht (2017).

Turnover, also known as collective turnover, is defined by Hausknecht and Trevor (2011) as "the aggregate levels of employee departures that occur within groups, work units, or organisations" (p. 353). Turnover models can be roughly divided into two categories: process models and content models. Process models concentrate on identifying the actions employees take during the quitting process. Examples are the developed feelings of wanting to quit or searching for alternative jobs. On the contrary, content models refer to research that identifies factors that cause employees to leave the company. This type of model looks into the attributes of the job, organisation and individual as alternative opportunities. Besides these two distinctions, a mixture of both process and content can also be found in the literature (Zimmerman, Swider, & Boswell, 2019).

Employee turnover research has a rich history. The first publications already appeared in 1917. Figure 2 provides an overview of the turnover publications from 1917 to 2017. This timeframe can be divided into six developmental stages. It all began with the birth of turnover research. The work from this period centred on the recognition of turnover costs. In the formative years, work has sought to describe the patterns in employee turnover. The first turnover model was proposed by March and Simon (1958). This model was further developed in the foundational model stage. Researchers began to look at possible correlations with job satisfaction, job alternatives and have deepened in the causes of turnover. This was further developed during the theory testing phase and the unfolding model phase. A shift in view emerged. Employee turnover was not per definition regarded as something negative. Turnover became the most famous in the 21st century. Multiple reviews and meta-analyses have been carried out to understand the predictors of turnover. Additionally, researchers have identified job embeddedness and HR-practices as predictors. To sum up, turnover research is a subject often studied including a lot of predictors.

2.1.2 Foundations of turnover research

The goal of this section is to dig a little deeper into the foundations of turnover research. The aim is not to provide a comprehensive review but to identify the most impactful predictors of employee turnover in general.

Birth of turnover research: the importance turnover research

The first years of turnover research were mainly focused on defining turnover, measuring the costs and why it was important to study this phenomenon. Examples of such publications come from authors like Fisher (1917) and Williams (1917). These studies have contributed to the realization that employee turnover is costly and that more research needs to be conducted to understand the phenomenon.

Formative years: the first turnover model

These first studies began to develop towards the first formal turnover model published by March and Simon (1958). They changed the world for turnover scholars because they introduced the constructs *perceived desirability of movement* and *perceived ease of movement* which lead to employee turnover. This model received a lot of empirical support and stood on the basis on answering the question why employees leave (Zimmerman et al., 2019).

Perceived desirability of movement. This one refers to the desire for someone to leave the current organisation. This is influenced by possible intra-organisational transfers and job satisfaction.

Intra-organisational transfers. The more internal jobs there are available within the current company the higher the chance someone can find a job that fits the needs of an employee without having to look out of the company and thus lowering the chance of employee turnover.

Job satisfaction is another variable that influence desirability of movement. This is based on: compatibility job/other roles, predictability relationships, conformity of job to self-image and calculative forces. The first one refers to the fit between the job and other roles within the organisation. It is expected that the more other roles ask from the person in a particular job the less satisfied someone is because someone has difficulties with finishing their tasks. The second one refers to how

predictable relationships and tasks are on the work floor. It is expected that more unpredictability would lead lower levels of job satisfaction because work is for example unstandardized and employees cannot trust on the work procedures of the company. The third one is about the fit between job and the self-image. It is expected the greater this fit the lower the level of job satisfaction. The last one is calculative force that refers to the future satisfaction. The higher the expected future satisfaction the higher the job satisfaction. These relationships can be summarized in the following hypothesis:

Perceived ease of movement. The second one represents the perception on how easy someone could leave the organisation. This is influenced by the perception of number of extra organisational alternative. This includes the number of visible firms and the visibility of the employee. The more visible firms for an employee the higher the chance of turnover because of extra opportunities outside the organisation. The more visible the employee is for a company the higher the chance a company approaches an employee, even companies that were not on the radar of the employee before. Resulting in the following hypothesis:

Foundation models

Whereas the model of March and Simon is regarded as the first content model, the first process model was introduced by Mobley (1977). This model shows how job dissatisfaction leads to employee turnover. It all starts with job dissatisfaction which is followed by the thought of quitting and searching for alternatives and compare it to the current job which could lead to staying or leaving (Lee, Hom, Eberly, Li, & Mitchell, 2017). This highlights again the importance of the effect of job satisfaction. The process model focuses on answering the question how employees quit and which thought pad they follow. Whereas, the content model tries to answer the question why employees quit and thus identifying the variables that influence/predict employee turnover. The latter is also the goal of this thesis research which will be to develop a content model for teachers (primary and secondary) in the Netherlands.

Mobley also came up with a content model. Comparing these two content models with each other they are similar. The variables from March and Simon can be found in the model of Mobley, they form the basis. The added value of Mobley is the model is more explanatory. This model includes more underlying variables than that of March and Simon. Main difference is that the variable intention to search and to quit are replacing the variables perceived desirability of movement and perceived ease of movement by March and Simon. Another distinguishment is that Mobley identified the variables into three main categories: organisational, individual and economic-labour market. These categories include variables that an organisation can internally influence but also include variables that are external and thus not in the hands of the organisation. This time period was also the time when the distinguishment between voluntary and involuntary turnover was made. This is described in the taxonomy of turnover (Bluedorn, 1978).

Theory testing: the unfolding model

The abovementioned models inspired other researcher to further develop the construct. Steers and Mowday (1981) introduced two new turnover causes; job performance and organisational commitment. They do not explicit differentiate in categories like Mobley did but they do distinguish a new group of variables called 'affective responses to job'. These include variables like job satisfaction

which we recognize from previous models, and introduce organizational commitment and job involvement. Higher levels of affective responses will lead to lower levels of employee turnover.

Unfolding model

Lee and Mitchell (1994) proposed the unfolding model of voluntary employee turnover. They identified four paths for turnover which all begin with a so-called shock. These are defined by Lee et al. (2017) as "jarring events that evoke thoughts of leaving" (Lee et al., 2017, p. 203).
They conceptualized four paths to turnover:

Path 1. Activated on shocks, e.g. employee wants to leave to attend law school and is accepted by the school (the shock).
Path 2. When a superior order a subordinate to perform something, illegal which makes the employee wants to quit.
Path 3. When employees receive attractive unexpected invitation to apply for an attractive job opportunity. It starts to question their current job commitment.
Path 4. Dissatisfaction-induces leaving which is based on the classical models.

Events, like these shocks, are stimulating the leaving process. There is some critique to this model. A more recent study (Morgeson, Mitchell, & Liu, 2015) found that meaning of shocks are perceived differently per individual. Furthermore, this model is not applicable to all situations and turnover types. This is due to the lack of including external labour market conditions. Nevertheless, this model is a good basis and serves as inspiration for the forces model which was developed in the next century.

21st Century Research

Job embeddedness. Until now most research focused on why people leave but Mitchell, Holtom, Lee, Sablynski, and Erez (2001) asked themselves a different question. Why do people stay? They captured this in their, now widely known, Job embeddedness model. This model includes both on the job (internal) and off the job (external) factors. The model consists of three dimensions; fit, links and sacrifice in the context of the organisation and the community. Fit is about the fit with the company and community. Links are about the links to other people in the organisation or community. Sacrifices refer to the perceived sacrifices people are making. It can be noticed that there are similarities with previous models from Mobley for example. The fit between individual and organisational/environment is identified already in earlier research. The contribution of the Job embeddedness model is that it put more focus on the fit, links and sacrifices of individual, organisation and community. They put these different variables under one construct: job embeddedness.

Forces. The forces model identifies different forces that contribute to voluntary turnover intentions. Maertz and Campion (2004) identified different types of quitters: the impulsive quitters (those who quit spontaneously due something which they perceive as large negative effect) and the comparison quitters (those who make comparisons between their current job and alternative jobs). The authors argue that every individual deal with different kind and levels of forces that influence their turnover intentions. This model was first introduced in 2004 and later revised in 2012. The nine forces include:

contractual (e.g. psychological contract), behavioural (e.g. organisation commitment), affective (e.g. towards organisation), constituent (e.g. commitment towards colleagues), alternative (e.g. perceived job alternatives), calculative (e.g. if possible future satisfaction), normative (pressures from others), moral (e.g. ethical values) and location forces (community embeddedness) (Maertz, Boyar, & Pearson, 2012). The hypotheses underneath are based on findings on the model of Maertz et al. (2012). Multiple forces can be recognized from earlier research mentioned above.

HR practices. Due to the emerge of the HR profession, HR practices evolved in employee turnover research. Research from the last decade identifies that employee turnover can be influenced by HR practices (Heavey, Holwerda, & Hausknecht, 2013). Heavey et al. (2013) distinguish two levels of HR. The first one is HR system, this is the overall strategy of HR. An example of that is high-performance workplace system. Although Heavey et al. (2013) does not provide an overview of the different HRM systems they do expect that HRM systems that includes high-commitment or high-performance work systems is expected to decrease turnover. The second layer, the HR practices, are in line with this overall focus. Examples of HR practices can be pay, benefits and recruitment. Heavey et al. (2013) have divided HR practices in two categories: a) HRM inducements and investments and b) HRM expectation-enhancing practices.

HRM inducements and investment. HR practices that belong to this category are: i.e., benefits, dispute resolution, high-commitment HR systems, internal mobility, participation-enhancing work design, proportion of full-time employees, relative pay, straight pay, variable pay, selection sophistication, skill requirements, staffing levels, staffing selectivity, and training. The goal of these practices is to build long term relationships and commitment. This will decrease the attractiveness of alternative organisations. Therefore, it is expected that HRM inducement practices lead to lower chance of turnover (Heavey et al., 2013).

HRM expectations-enhancement practices. This category includes: downsizing rate, electronic monitoring, managerial oversight, and routinization. These HR practices are interventions to reduce employee autonomy and improve the organisational control and thus improving monitoring and routinization. These HRM practices are expected to relate positively with employee turnover (Heavey et al., 2013).

Model Zimmerman et al. (2019) . Most recent employee turnover research was conducted by Zimmerman et al. (2019).They argued that although a lot of predictors and models were tested throughout the history of turnover research, they lack consistency. They conducted a literature review study in which they searched for overlapping constructs that predict employee turnover. This model is based on the most impactful predicators and consists of the following concepts: Affect toward organization, Work environment, Instrumental attachment, Extra organisational ties, Sense of obligation. These are all found in the previous models mentioned above.

Because this research includes historical timeline of turnover research it is valuable to compare my model to theirs. Similar is that I also included the following models: March and Simon (1958), job embeddedness from Mitchell et al. (2001) and the forces model from Maertz et al. (2012). Differences are that I use the newest version of the forces model and that my model includes more variables. The

proposed model, which is shown in figure underneath, does not include variables like: effect of HR, age, tenure, trends in the labour market, educational level, job performance (which are included in Mobley 1977). Another difference is that (Zimmerman et al., 2019) divided the variables in two categories: desirability of movement and ease of movement. Whereas my model includes these variables separately.

Conclusion

To summarize, in the past century a lot of research was conducted on predicting employee turnover. Each model has taken turnover research a step further. Because models are based upon previous research there can be found a lot of similarities between models. It all started with two main predictors: ease of movement and desirability of movement. Later more emphasize where given to personal and external factors. For example, by including labour market trends and personal values/norms. More recent models changed the view of looking to employee turnover and treat predictors as forces. What is interesting though is that the role of HR only included in one of the more recent models. Which would make sense given the development of HR in the recent decades. To provide an overview of all the theory mentioned above the models are compared and merged. Keep in mind that the goals were to identify and summarize the variables that impact employee turnover and not their underlying relationships.

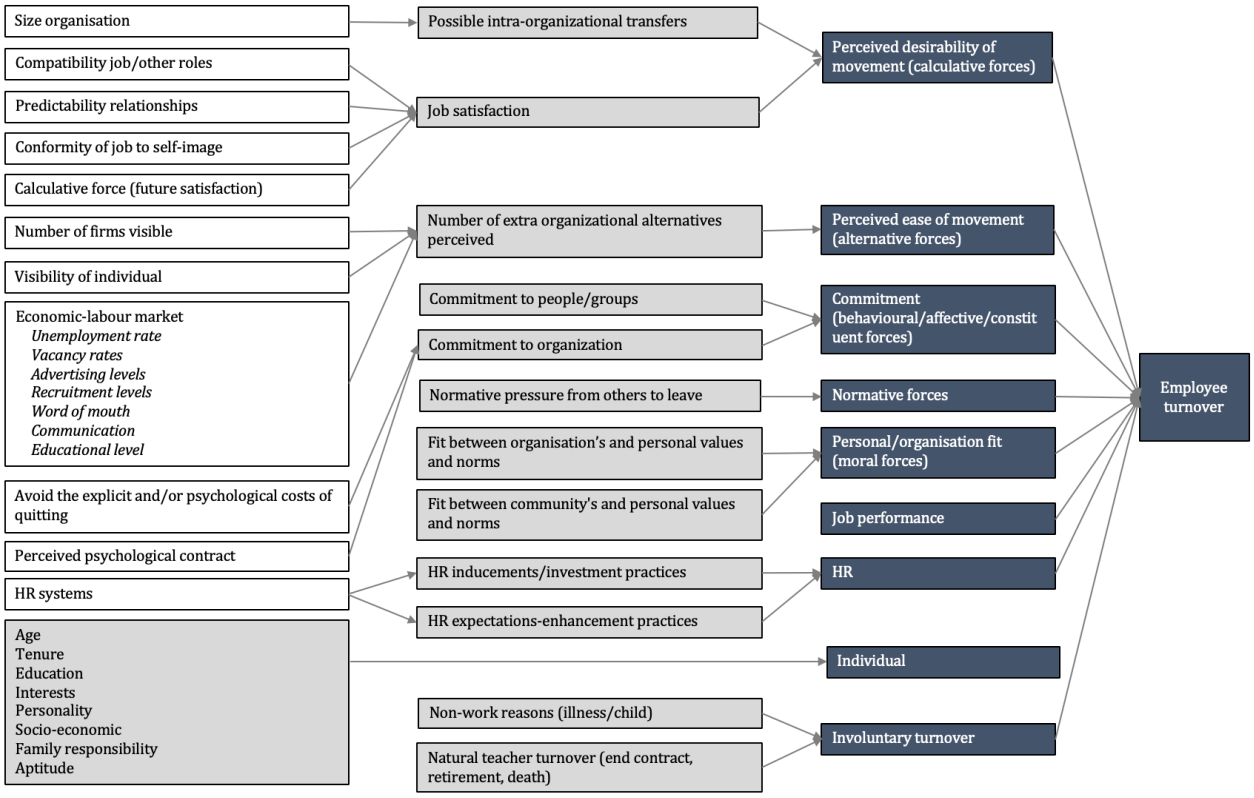


Figure 4 | Proposed conceptual model employee turnover