ANNENBERG
BROWN UNIVERSITY

EdWorkingPaper No. 24-979

Beyond the silver bullet: Unveiling multiple pathways to school turnaround

Stefan Arora-Jonsson
Uppsala University

Ema Kristina Demir
Stockholm School of Economics

Axel Norgren
Linköping University

Karl Wennberg
Linköping University

Research on school improvement has accumulated an extensive list of factors that facilitate turnarounds at underperforming schools. Given that contextual or resource constraints may limit the possibilities of putting all of these factors in place, an important question is what is necessary and sufficient to turn a school around. We use a qualitative comparative analysis (QCA) of 77 Swedish schools studied over 12 years to answer this question. Our core finding is that there is no "silver bullet" solution. There are, instead, several distinct combinations of factors that can enable a turnaround. The local school context is essential for which combinations of factors are necessary and sufficient for school turnaround. We discuss implications for research on school improvement and education policy.

VERSION: June 2024

Suggested citation: Arora-Jonsson, Stefan, Ema Kristina Demir, Axel Norgren, and Karl Wennberg. (2024). Beyond the silver bullet: Unveiling multiple pathways to school turnaround. (EdWorkingPaper: 24-979). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/vr1n-jr15

Beyond the silver bullet: Unveiling multiple pathways to school turnaround

Stefan Arora-Jonsson[ba], Ema Kristina Demir[a], Axel Norgren[ac] and Karl Wennberg[ac]

[a]*Center for Educational Leadership and Excellence, Stockholm School of Economics, Stockholm, Sweden*

[b]*Department of Business Studies, Uppsala University, Uppsala, Sweden*
[c]*Institute for Analytical Sociology, Linköping University, Norrköping, Sweden*

Corresponding author details*
Ema Kristina Demir
ema.demir@hhs.se

Notes on contributors:

Stefan Arora-Jonsson is a professor of Organisation at the Department of Business Studies at Uppsala University and visiting professor at the Center for Educational Leadership and Excellence at the Stockholm School of Economics. His research focuses on the organisation of competition, in particular among schools.

Ema Kristina Demir, PhD in Education, University of Cambridge, is a researcher at the Center for Educational Leadership and Excellence at the Stockholm School of Economics. Her research focuses on teacher social capital and professional learning, the organisation of schools, and leadership toward educational equity.

Axel Norgren is a PhD student at the Institute for Analytical Sociology at Linköping University and an affiliated researcher at the Center for Educational Leadership and Excellence at the Stockholm School of Economics.

Karl Wennberg is a professor and director of the Center for Educational Leadership and Excellence at the Stockholm School of Economics. His research spans educational leadership, school segregation, and organisation research.

Acknowledgements: We are grateful for comments from participants at the 2023 Ecer conference in Glasgow, the 2023 Bera Conference in Birmingham, as well as participants at Stockholm University, Annenberg Institute at Brown University, and the Stockholm School of Economics.

Abstract

Research on school improvement has accumulated an extensive list of factors that facilitate turnarounds at underperforming schools. Given that contextual or resource constraints may limit the possibilities of putting all of these factors in place, an important question is what is necessary and sufficient to turn a school around. We use a qualitative comparative analysis (QCA) of 77 Swedish schools studied over 12 years to answer this question. Our core finding is that there is no "silver bullet" solution. There are, instead, several distinct combinations of factors that can enable a turnaround. The local school context is essential for which combinations of factors are necessary and sufficient for school turnaround. We discuss implications for research on school improvement and education policy.

Keywords: school turnaround, qualitative comparative analysis (QCA), school leadership, teacher collaboration, high academic expectations.

Introduction

The question of how to turn around underperforming schools is central to education policy (Leithwood et al., 2010). Debates have raged over the relative merits of slow and steady improvement versus quick and radical efforts (Fullan, 2007; Kim et al., 2018), the need for new resources versus reorganisation (Hopkins, 2003; Murphy & Meyers, 2007) and the importance of context (Hallinger & Kantamara, 2001; Sun et al., 2007). The abundance of advice on how to turn around underperforming schools has resulted in a bewildering knowledge landscape for researchers and policymakers. It is easy either to focus on a "silver bullet" solution that ostensibly addresses all situations or to be distracted by the wide range of suggested actions without a guide to prioritise among them. At the core of the problem lies the ever-present need to make trade-offs. Although improving schools in all the ways positively associated with school turnaround would be ideal, this may not be feasible. An alternative strategy is identifying the minimum conditions required to turn a school around, which we seek to do in this study.

The first step in sorting among the factors associated with school turnaround is acknowledging the importance of institutional context (Meyers & Smylie, 2017). For example, it is a moot point whether human resource management initiatives such as a swift replacement of teachers and principals is conducive to school turnaround if teacher shortages or employment laws render such action impossible. The second step is to admit the idea of equifinality, acknowledging that there can be several causal pathways through which a school can reverse its underperformance, and that these pathways can sometimes be complex (van Der Steen et al., 2013). However, allowing for causal complexity and equifinality presents methodological challenges. Regression analysis based on least-square methods does not lend itself to analysing equifinal processes (Ragin, 2014). While case studies do allow for

equifinality, standard case-study methods severely limit the number of cases that can be compared, thereby limiting the generalisability of findings and possible insights to be drawn.

We overcome these challenges by using qualitative comparative analysis (QCA), a method developed to enable systematic comparative analysis of medium-to-large numbers of case studies (Ragin, 2014). QCA enables the simultaneous analysis of multiple cases and yields the necessary and sufficient conditions for a particular outcome – in our case, school turnaround. Because the method can derive multiple sufficient solutions for an outcome, it allows for equifinality; in other words, we can obtain several different "recipes" for how to turn around a school.

We employ QCA to study the conditions behind the turnaround of underperforming schools in Sweden – a country that notably suffers from an increasingly sharp divide in performance outcomes across schools (Edmark et al., 2014; Holmlund et al., 2019). To do so, we construct 77 single-organisation case studies of schools across Sweden sampled based on their socio-demographically adjusted educational performance over 12 years[1]. The schools were sampled from the lowest-performing quartile of schools in Sweden. We identify 42 schools that managed to turn around and end up above the median in terms of student performance during the period and compare them to a sample of 35 schools that remained in the lowest quartile throughout the period. Drawing on earlier case studies examining school success factors in Sweden and Scandinavia (Ahlström & Aas, 2020; Jarl, Andersson, et al., 2017), we identify four conditions that contribute to school improvement and increased student achievement: a principal who is focused on core operations, a collaborative culture among teachers, pupils who experience high academic expectations and a school organiser

[1] Performance is adjusted by the pupils' socioeconomic background to examine a broader set of schools than the conventional lowest-performing schools often found in the turnaround literature.

(municipal school district or independent school board[2]) that works systematically with quality assurance.

Our research question is: *What are the necessary and sufficient conditions for school turnaround?* To answer it, we test which of these four conditions, alone or in combination, are necessary and/or sufficient for school turnaround. In addition, we explore the impact of contextual factors on these conditions and their combinations. We validate and nuance our findings through in-depth interviews with principals and school-district representatives and conduct several robustness tests. Based on these results, we discuss implications for research on school improvement and education policy.

To the best of our knowledge, this is the first study of school turnaround using QCA and the first systematic study of school turnaround in a Scandinavian setting. Our analysis suggests at least two distinct ways of turning around an underperforming school in Sweden. While we find no necessary or sufficient conditions that work in isolation, our findings suggest trade-offs that can ease the navigation of resource constraints and contextual factors in order to achieve a turnaround. In particular, some schools can successfully achieve turnaround without fulfilling all conditions, and the conditions needed vary across contexts. For policymakers, this should serve as a caution against general reform initiatives but also provide some encouragement, as there are several paths to improve underperforming schools. For educational researchers, we offer an approach that enables the analysis of causally complex and contextual pathways to school improvement.

[2] Municipalities run most Swedish schools, but about 15–20% are run by private corporations. Our sample contains a mix of both.

Literature Review

School turnaround

Most literature on organisational turnaround is found in the field of business management, but the last two decades have seen a rapidly expanding literature on turnaround in public organisations and schools (e.g. Jas & Skelcher, 2005; Leithwood et al., 2010; Murphy & Meyers, 2007). Prompted by the popular "No Child Left Behind" and "Race to the Top" programmes in the United States, many scholars set out to study the conditions for, and outcomes of, initiatives to improve schools and school districts (Heissel & Ladd, 2018; Herman, 2012; Papay et al., 2022; Player & Katz, 2016). Studies of turnaround schools have also been conducted in Europe (Schaffer et al., 2012; Skedsmo & Huber, 2021) and Asia (Liu, 2017; Tao, 2022). However, most published research consists of conceptual work (Leithwood et al., 2010; Meyers & Smylie, 2017; Murphy & Meyers, 2007) and small-n case studies (i.e., those involving only a few study subjects) (Duke & Salmonowicz, 2010; Hallinger & Kantamara, 2001). The available large-n studies are predominantly quantitative (regression-based) studies that do not address questions of equifinality (Boyne & Meier, 2009; Heissel & Ladd, 2018; Player & Katz, 2016).

The term "turnaround school" is used in different ways across literatures to mean either a school that has substantially improved its performance or a specific model for school improvement in the U.S. (Hansen, 2012; Hill et al., 2023; Meyers, 2012). We define school turnaround as a positive change in the educational performance of students in a school that is dramatic, substantial, or significant in magnitude and quick in speed (Herman, 2012; Liu, 2017; Peck & Reitzug, 2014). With respect to the difficult question of how much improvement is required for a case to be considered a turnaround, we follow earlier work in defining turnarounds.

Findings from quantitatively oriented studies in the U.S. point to a set of factors related to school turnaround. The first is the *organisation of teachers* (Boyne & Meier, 2009; Leithwood et al., 2010)[3], although efforts at teachers' professional development can sometimes be detrimental to school turnaround (Heissel & Ladd, 2018). *Effective school leadership* is another factor identified across different studies (Boyne & Meier, 2009; Player & Katz, 2016). Murphy and Meyers (2009) add that a school's *organisational capacity* – in terms of culture and relations among its members – is crucial to turnaround[4]. The *context* in which the school operates is also essential in terms of the support and resources available from those who organise the local school system – for instance, a school district or school board (Boyne & Meier, 2009; De la Torre et al., 2013; Player & Katz, 2016).

Case studies of turnaround schools in Europe identify a similar set of factors but typically place greater emphasis on the complex relationship *between* these. Jas and Skelcher (2005) develop a theoretical framework based on comparative case studies of 15 English local education authorities. Along with *leadership capabilities*, they emphasise the role of the *governance chain* – i.e., the relationship between a school and its school board – in turning around a school. In addition, the *school leadership* must be alert to poor performance (Jas & Skelcher, 2005) – an awareness that can be prompted by school board inspections. Skedsmo and Huber (2021) examine turnaround strategies and outcomes in 10 schools in a large German city and arrive at similar conclusions; they emphasise the *collective organisational effort* required for school turnaround.

[3] This includes aspects such as *teacher empowerment* (Hitt et al., 2018; Kim et al., 2018; Murphy & Meyers, 2009), and *teacher accountability* (Duke & Salmonowicz, 2010).
[4] This includes *high academic expectations of students* (Hitt & Meyers, 2018; Papay et al., 2022), *information sharing* networks among teachers (Sun et al., 2007) and a *shared vision among teachers and leaders* (Hitt & Meyers, 2018; Leithwood et al., 2010).

School turnaround as a complex process

Several studies criticise the prevailing assumptions that guide turnaround programmes and research for downplaying the complexities of turning around a school. Meyers and Smylie (2017) question the policy focus on short-term initiatives and what they call the "myths" regarding school turnaround; for instance, that drastic measures equal improvement, that lasting change can happen quickly, and that turnaround is a problem and task for individual schools. They take issue with generic school improvement methods and argue instead that school turnaround is a contextually dependent challenge for the whole school system, not only individual schools. This line of reasoning is also found in Herman (2012), who discusses the lack of generic and scalable turnaround strategies.

Central to these studies is the argument that there is no "silver bullet" solution for school turnaround, and generic success factors should be viewed with scepticism, as context and school system factors are vital. While effective leadership stands out as a critical factor, it is subject to many conditions – for instance, the organisation of teachers and the resources and involvement of the school district. Also, the turnaround process is not always linear in its progression. Meyers and Smylie (2017) stress that the improvement process can be uneven and does not necessarily have to be fast or that it needs to follow a U-shaped trajectory of initial decline, stabilisation, and improvement. There can be reversals, multiple dips, and many other trajectories. Going one step further, van Der Steen et al. (2013) argues that the school improvement process could be conceptualised as loops with potentially unexpected, disproportionate, and delayed outcomes. Several other studies find a myriad of factors interacting with and shaping the turnaround process (Henry et al., 2020; Herman, 2012), together suggesting that the turnaround process of a school is likely complex.

School turnaround in the Scandinavian context

Although there are, to our knowledge, no studies on school turnaround in the Scandinavian context, a related body of research on school improvement and educational effectiveness discusses factors associated with more and less successful schools. These studies suggest that high-performing schools are characterised by a principal focused on core operations, teachers who collaborate, high academic expectations of pupils and a school district with a strong focus on systematic quality control (Ahlström & Aas, 2020; Jarl, Andersson, et al., 2017; Jarl et al., 2021). Conversely, poorly performing Swedish schools tend to lack some or all of these conditions (Jarl et al., 2021; Jarl, Blossing, et al., 2017).

The comparative case studies by Jarl, Blossing, et al. (2017) and Ahlström and Aas (2020) focus on the importance of *high academic expectations of pupils* and an organisational culture that allows the principal and organiser to *conduct quality control and implement changes* that are perceived as legitimate. In addition, a study by Adolfsson and Alvunger (2017) emphasises that both teachers and school leaders must participate in the change process. Quantitative Swedish studies also find that individual principals can causally impact student outcomes such as grades (Böhlmark, Grönqvist, et al., 2016).

These Scandinavian studies largely mirror the international turnaround literature in stressing the importance of school leadership that is focused on results. However, they differ in placing greater emphasis on the importance of teacher collaboration, organisational norms and stability for high-achieving schools (Forfang & Paulsen, 2021). One possible reason could be that the Scandinavian context is characterised by strong labour laws that make it difficult to dismiss staff, which means that groups of teachers who do not collaborate may still have a significant impact on pupil performance. Another Swedish study, by Liljenberg (2022), surveying teachers and school leaders, finds that a collaborative culture in teacher teams is the most critical factor for school improvement.

In line with the idea that school turnaround likely is a complex process, we can see these different findings – the importance of leadership, teacher collaboration and culture, quality control and other support structures for the school – as possibly important factors that, together or separately, could lead to the turnaround of a school. In line with standard QCA convention (Ragin, 2014) that we discuss further in the method section, we use these findings as 'conditions' that have been shown in earlier work to be causally related to school turnaround. Below, we formalise the findings from earlier literature into conditions that we will use in our study.

Conditions for school turnaround

Teacher Collaboration is the first condition that we identify from the literature. Several earlier studies suggest that having teachers who collaborate is causally related to turning around a school (Boyne & Meier, 2009; Meyers & Smylie, 2017; Skedsmo & Huber, 2021). This condition denotes a situation of high teacher alignment regarding shared norms and a collective culture focused on learning; see, for instance, Ahlström and Aas (2020); Jarl, Blossing, et al. (2017). In a similar vein, teachers sharing a vision of the school's purpose has been described as a key platform for organising teaching and school leadership when implementing change (Adolfsson & Alvunger, 2017; Leat et al., 2006).

Principal's Focus on Core Operations is the second condition we identify. This condition speaks to the critical role of effective school-level leadership in the turnaround process, which has been stressed as a critical factor across a variety of school contexts (Jarl, Blossing, et al., 2017; Jas & Skelcher, 2005; Murphy & Meyers, 2007). A principal who focuses on core operations works as an instructional leader to promote students' knowledge development (Goddard et al., 2015). The principal as a leader at the school level can also be vital for setting out a vision and actively leading by example (Höög et al., 2005; Skedsmo & Huber, 2021). The principal's role as the instigator of the turnaround processes is motivated

by the need to align the school towards a common goal focused on core operations, i.e., educating pupils (Jarl, Blossing, et al., 2017).

High Academic Expectations is the third condition at the school level. In empirical studies of Swedish schools (Ahlström & Aas, 2020; Jarl, Blossing, et al., 2017) as well as internationally (Hitt & Meyers, 2018; Papay et al., 2022), consistently high academic expectations of pupils have been identified as important for improving underperforming schools. High academic expectations are commonly described as an important aspect of students' classroom experiences, reflecting the extent to which teachers value academic achievement and expect that all students can and should work towards their full potential. A school that cannot set consistently high academic expectations risks blaming the school's poor performance on pupil characteristics such as the lack of motivation or capability or background factors such as socioeconomic disadvantage. This condition does not necessarily stress a "culture of excellence" but simply denotes that teachers firmly believe that all pupils can and should succeed (Jarl, Blossing, et al., 2017).

The School District's Systematic Quality Assurance is our fourth condition. This condition captures essential aspects at the district or municipal level. The quality of a school can depend on the interplay between the school and the school district, as the central administration provides and allocates resources (Jarl, Blossing, et al., 2017; Jas & Skelcher, 2005). International research on school turnarounds stresses that the school district must be involved in the turnaround process as schools are a part of organisational systems (Meyers & Smylie, 2017). In the Swedish context, school districts are responsible for evaluating and incentivising school development through their systematic quality assurance work (Ahlström & Aas, 2020). This can be done by the municipal board of education or the school corporation board, depending on whether the school is public or independent. For clarity, we will refer to all these types of actors simply as "the school district".

Contextualising the conditions

Besides these four core conditions that we expect to be related to school turnaround, we also explore a few contexts under which our conditions may behave differently. Several contextual conditions are suggested in earlier work as important in differentiating schools' varying prospects of achieving a turnaround – the socioeconomic status (SES) of a school's pupils, its financial resources and whether it is in an urban or rural area (Boyne & Meier, 2009; Meyers & Smylie, 2017; Murphy & Meyers, 2007). Out of these, we focus on pupils' SES and whether or not the school is located in an urban setting, as the question of financing is relatively less important in differentiating the possibilities of a school turnaround in the Scandinavian setting (Ahlström & Aas, 2020; Jarl, Blossing, et al., 2017). Although municipalities differ in their financial strength, there are extensive cross-municipal transfer systems in place to even out such differences. The municipality funds all schools – whether privately or municipally operated – and the funding for each school is distributed to compensate for differences in pupil population SES, with the aim of promoting educational equity. This does not mean that all Swedish schools are financially equal, but that there are redistributive systems in place to minimise the effects of socioeconomic differences.

Whether a school is in an *urban or non-urban context* may also influence the operation of our four identified conditions in several ways (Jarl, Blossing, et al., 2017). Most importantly, urban contexts are more likely to be competitive settings – where several schools contend for principals, teachers and students – than non-urban settings (Borman & Dowling, 2008; Böhlmark, Holmlund, et al., 2016; Edmark et al., 2014; Guarino et al., 2006). It is a priori unclear whether a turnaround is inherently easier in one context over the other. In competitive urban contexts, the opportunities for principals and teachers to change employers are greater, potentially eroding collegial cultures and complicating turnaround efforts.

Conversely, a higher turnover of staff might facilitate replacing dysfunctional teams. Also, in districts with multiple schools, attention from the school district officials may be divided. On the other hand, there is greater potential for sharing resources and leveraging quality control insights across schools compared to non-urban areas with fewer schools. Additionally, there is a 'local community effect' to consider. In non-urban contexts, principals and teachers often have more social interactions outside of school with pupils' parents, fostering a feedback mechanism for quality control that might be less prevalent in urban settings.

Studies in the U.S. context show a positive relationship between a human resource management strategy of upgrading the human capital of a school (i.e., the quality of teachers and principals in terms of educational attainment, qualifications, breadth of experience and tenure within the educational system) and school turnaround (Harbatkin, 2022; Henry et al., 2020). However, Swedish employment laws (a fundamental aspect of what is known as the Swedish Model) severely curtail the possibility of strategically replacing lower-quality teachers/principals with higher-quality ones. Staff can only be dismissed in order of employment (last in, first out) and on grounds of redundancy or exceptional misconduct with at least three months' notice[5]. Thus, using human resource management to alter school-level human capital is rarely a possible strategy for rapid turnaround in the Swedish context. We therefore focus on the SES profile of schools and whether they are in an urban or rural area as contextual conditions.

We also regard the *visibility* of a school's underperformance as a context that modifies the operation of our conditions in the analysis. In a comparative case study of a Swedish and a Norwegian school, Ahlström and Aas (2020) show that a school that was conspicuously low-performing (i.e., displaying poor performance in absolute terms) demonstrated more success in executing a turnaround compared to a school that, although not performing poorly in

[5] For information about Swedish employment laws, see https://www.government.se/government-policy/labour-law-and-work-environment/198280-employment-protection-act-lag-om-anstallningsskydd/

absolute terms, was underperforming when its results were linked to its pupils' SES. In their analysis, Ahlström and Aas (2020) highlight that the latter school lacked insight into its underperformance. This discovery resonates with a well-established principle in organisational change theory that organisations tend to initiate change efforts only when their expectations or aspirations are unmet (Cyert & March, 1963; Greve, 1998).

As we include both absolutely and relatively (in relation to pupil SES profile) poorly performing schools in our sample, we have a condition that identifies the external pressure for change at a school (*Change Pressure*) based on its *absolute* performance. The intuition behind this condition is that if a school is performing poorly in absolute terms, it may come under external pressure – for instance, from the school district, parents or local media – to improve pupil outcomes (Adolfsson & Alvunger, 2017; Larsson Taghizadeh, 2016). Since these stakeholders are less central to the organisation than teachers and principals, they are likely more receptive to absolute measures of performance (e.g., Abdulkadiroğlu et al., 2020). Schools experiencing this additional pressure may be more prone to take measures to turn the school around compared to schools that only perform poorly relative to pupil SES[6]. This is heightened by the fact that Swedish schools (since 1991) compete for students through a universal voucher system. This means that a poorly performing school, insofar as stakeholders are aware of its performance, would have difficulty attracting students, especially those with strong academic backgrounds. However, in non-urban municipalities with only one or a few schools, competition is limited or non-existent. This condition also accounts for possible differences in the organisational capacity of schools, given that schools and school organisers in a non-urban contexts may have more limited financial and human resources (Hallinger & Liu, 2016; Hargreaves et al., 2009).

[6] The contextual condition of *Change Pressure* (absolute performance) can partially be compared to the traditional 'lowest performing schools' usually targeted by NCLB and similar U.S. turnaround programs.

A general conclusion from the literature overview is that school turnaround is a complex matter (van Der Steen et al., 2013). The extensive list of conditions identified in various contexts related to successful school turnaround provokes several questions for researchers, educational policymakers, and practitioners. How does one prioritise among the many conditions conducive to school turnaround? How are these factors causally related? Are these conditions additive, such that more is better, or are certain conditions replaceable by others? Can some conditions even block the workings of other conditions? Can there be more than one way to turn a school around? To address these questions of causal complexity and possible equifinality, we introduce the QCA method in the next section.

Method

Qualitative Comparative Analysis (QCA)

Qualitative Comparative Analysis (QCA) is a method for examining how different combinations of conditions form a causal chain to generate a particular outcome (Ragin, 2014). QCA follows more or less the steps of any comparative case analysis: define the theoretical concepts under investigation, empirically operationalise these for several cases, and systematically compare across cases how the concepts relate to an outcome of interest. The difference lies in the ability of QCA to analytically handle larger numbers of cases.

A QCA analysis begins by identifying conditions – factors that in previous research literature have been found or credibly argued to be causally related to the outcome of interest. QCA is not primarily a method for testing these individual causal relationships but for analysing how several already known causal relationships (conditions) combine to generate an outcome. In our study, one example of a condition known from earlier literature as a possible cause of school turnaround is teacher collaboration; another is teachers having high academic expectations of students.

The next step is to operationalise these conditions empirically – i.e., clearly define what determines the fulfilment of each condition being assessed, including the outcome in the particular context of the empirical study. This is what is known as the 'calibration of conditions' and involves specifying clear and precise empirically grounded criteria for each condition. The goal of the calibration process is to ensure a relevant variation in qualitative states enabling researchers to accurately assess their relationship with the outcome of interest. The process of calibrating conditions – deciding what constitutes the criteria for deciding whether a particular case is "in" or "out" of a condition – is essential when conducting QCA. It should, like other qualitative approaches, be based on theoretical and expert knowledge about the empirical context at hand to capture relevant variation when setting a qualitative

anchor (Ragin, 2009; Schneider & Wagemann, 2012). To continue the example, calibration involves defining what would empirically constitute a turnaround of a school (outcome) and what would empirically constitute good teacher collaboration and high academic expectations of students.

There are two main approaches to calibrating conditions. In the "crisp set" approach, each case is classified as either fully present or fully absent in terms of a particular condition: cases either meet the criteria for inclusion or not (Ragin, 2009). This approach assumes binary distinctions between the presence and absence of conditions, with no shades of grey in between. Crisp set analyses are often easier to interpret and apply (Schneider & Wagemann, 2012). In contrast, the "fuzzy set" approach involves assessing the degree to which each case meets the criteria for inclusion or not. This approach acknowledges that case-inclusion in a condition sometimes may exist on a continuum. The choice between these approaches depends on the nature of the data, the complexity of the relationships being studied, and the level of precision required in the analysis. We chose a crisp set approach as it enables easier calibration and interpretation, and the outcome (turnaround), as well as many of the conditions, lend themselves to binary classification.

In the first step, QCA generates a table, referred to as a 'Truth Table', where each row depicts a possible combination of conditions, as well as an indication of whether the outcome is present or not. By analysing the Truth Table, we can systematically identify *configurations of conditions* or "recipes" for the outcome to occur. The QCA process is, thus far, similar to any comparative case study, but with the advantage that the number of cases in the analysis can be greater. To handle a large truth table, including many cases, QCA utilises set-theoretical logic, Boolean algebra and a minimisation algorithm to reduce the truth table into a relevant configurations or "solutions". At the core of QCA is the idea that complex causal chains can be understood as configurations of separate causal conditions (Ragin, 2014). In our

example, high academic expectations and teacher collaboration are separate conditions of a school that are causally related to school turnaround (along with other possible conditions).

By comparing cases (schools that turn around alongside those that do not), QCA enables an analysis of what conditions – separately or in combination – are *necessary* and/or *sufficient* for school turnaround (Schneider & Wagemann, 2012). A necessary condition is present whenever the outcome (school turnaround, in our case) is present, although there can be cases where the condition is present but not the outcome. For a sufficient condition, the outcome is present whenever the condition is present, although there can be cases when the outcome is present but not the condition (Schneider & Wagemann, 2012).

A QCA analysis thus identifies the different solutions for school turnaround. For instance, we may learn that high academic expectations are sufficient in a particular solution but must be coupled with a collaborative culture among teachers in other solutions. QCA also allows for *equifinality*, i.e., the possibility that different recipes can lead to the same outcome, and *causal asymmetry*, meaning that the presence of a condition can lead to an outcome, while its absence (negation) does not necessarily lead to the negation of the outcome (Schneider & Wagemann, 2012). In addition, some conditions can, in effect, be *irrelevant* to a solution, as either their presence or their absence can lead to the outcome. This approach allows for an analysis that can handle causal complexity[7] and contextual nuance while clarifying the relative importance of the different causal conditions.

In the next step, QCA involves assessing the solutions in terms of *consistency* and *coverage*. Both measures are essential for evaluating the explanatory power and robustness of solutions. Solution coverage refers to the extent to which the combinations of conditions within a solution account for the occurrence of the outcome across cases. Solution consistency is a measure of how consistently the solution yields the outcome (Oana et al., 2021; Schneider

[7] Causal complexity refers to the occurrence of conditions in *conjunction*, *equifinality* and *causal asymmetry*.

& Wagemann, 2012). QCA further distinguishes between *raw* coverage and *unique* coverage. Raw coverage is the proportion of cases in the dataset that are accounted for by the combinations of conditions identified in a particular solution, without considering any overlap or redundancy between solutions, and gives a general idea of how well the solution explains the outcome across the entire dataset. Unique coverage, on the other hand, considers only cases uniquely explained by a specific solution, showing each solution's distinct contribution not covered by alternative solutions, i.e., cases exclusively associated with particular combinations of conditions.

QCA has been used in various fields such as sociology, political science or management studies to explore complex relationships between conditions (Thomann, 2020). Lately, there has been growing recognition across various social science disciplines of the method's capacity to generate innovative insights with respect to enduring questions by allowing for theorising and investigating equifinality and conjunctive relationships and stimulating fresh avenues of research (Furnari et al., 2021). Even though QCA has been suggested as a valuable methodological approach to understanding the multifaceted nature of educational systems and outcomes (Bingham et al., 2019), the potential of this approach remains largely untapped in education research (Cilesiz & Greckhamer, 2020). There are examples of studies where QCA has been employed to investigate the combination of factors that contribute to student achievement (Yu & Jiang, 2022) in comprehensive and selective schools (Glaesser & Cooper, 2012) and in higher education (Capano & Pritoni, 2020). No research has, to our knowledge, applied QCA to school improvement research, nor the specific study of school turnaround.

Why QCA?

We use QCA given that the causal processes behind a school turnaround may be complex and that there can be several ways in which a school can be turned around. An alternative way to deal with questions of causal complexity is the standard comparative case method – see, for instance, Jarl, Blossing, et al. (2017). This would, in principle, be similar to using a QCA, but with the drawback that it would be exceedingly difficult to compare a larger number of cases (Ragin, 2014). Manually comparing 77 cases along four dimensions plus two contextual dimensions of possible similarity and difference is a task that would daunt most researchers.

Another alternative analysis method, developed to handle a larger number of cases, are techniques of statistical regression. This is the standard method used for large-n studies of school turnarounds. Regression methods allow for sophisticated tests of causal relationships and accuracy in estimations of effect sizes. QCA, on the other hand, has not been developed to test specific causal relationships, but for analysing complex chains of already known causal relationships. The two methods are thus, in a sense, complementary: While regression-based methods establish specific causal relationships, QCA enables the analysis of how several such relationships fit together in complex causal chains to generate an outcome (Ragin, 2014).

The central limitation of a regression-based approach, with respect to our purposes, is that it provides an estimation of the net effects of each of the factors related to the turnaround of a school (Ragin, 2014) under the presupposition of a fairly straightforward causal story: more of everything will lead to a better result, while the absence of factors will lead to a worse result. It is, of course, possible to model a more complex causal story using, for instance, interaction terms, but the results often become difficult to interpret (Furnari et al., 2021). This is an important limitation, given that school turnaround has been argued to be a complex process that can be equifinal, i.e., that there can be several different causal paths to

turnaround (Meyers & Smylie, 2017; Murphy & Meyers, 2007). To turn around a school, our literature review suggests, you need motivated students, competent and collaborating teachers, a results-oriented principal and a school district that is supportive yet demanding. As noted, it is possible that these conditions could combine in more complex ways. Perhaps the presence of a principal with a focus on core operations is *all* that is needed? Or maybe there can be no turnaround if teachers do not collaborate – no matter how focused the principal is, how high the academic expectations of pupils are or what sort of quality assurance system the school district has in place. Perhaps high academic expectations are only important when there is a principal who focuses on core operations? These speculations suggest a need to investigate causal chains of greater complexity – which is what motivates the use of the QCA method(Furnari et al., 2021; Ragin & Fiss, 2008). Instead of assuming, as in a typical regression-based study, that it is only the causality[8] of student + teacher + principal + school district that generates a turnaround, we can ask conjunctive questions: whether the student condition *and* the teacher condition, but *without* a strong principal, can lead to a turnaround; whether the teacher condition *and* principal can lead to a turnaround without the student condition being fulfilled – and so on.

The ability of conjunctive theorising and analysis is important as turnarounds are, as have been noted earlier, diverse. QCA allows us to disentangle messy empirical observations into multiple context-specific recipes for school turnaround – something called for in both research and educational policy (Herman, 2012; van Der Steen et al., 2013). In sum, we employ QCA as it allows us to deal with the complexity of school turnaround: we can retain some of the richness and contextual sensitivity of case studies while still striving to identify broader patterns.

[8] The '+' sign here does not imply a Boolean OR condition, but is meant to demonstrate the logic of addition in linear algebraic equations such as those used in regression models.

Operationalisation of educational performance

The outcome of interest in our study is school turnaround, i.e., a positive change in educational performance of the students in a school that is dramatic, substantial or significant in magnitude and quick in speed (Herman, 2012; Liu, 2017; Peck & Reitzug, 2014). We operationalise educational performance of schools as the percentage of pupils achieving at least a pass grade in all subjects, adjusted for socioeconomic (SES) indicators. We draw the data for educational performance from the Swedish National Agency for Education's publicly available database (Swedish National Agency for Education, 2022). This comprehensive database offers an SES index per school based on background variables. The index is officially acknowledged and used by education authorities and providers to allocate resources. It is a weighted average score per school based on three SES indicators: parents' highest level of education, the ratio of boys to girls to account for the reversed gender gap in education where boys are falling behind (Holmlund et al., 2019; Quenzel & Hurrelmann, 2013), and the ratio of newly immigrated pupils[9]. The database also includes absolute pupil performance, predicted school performance (contingent upon pupil SES) and SES-adjusted pupil performance. The adjusted performance measure is quantified as a residual derived from a least-square model predicting the percentage of pupils achieving at least a pass grade in all subjects upon completing compulsory schooling (year 9), based on the SES-index.

Using SES-adjusted performance allows us to identify underperforming schools across the performance spectrum and examine solutions for different types of underperformers[10]. An SES-adjusted measure also enables us to capture genuine improvements in schools' educational performance, rather than outcomes that merely reflect shifts in pupil

[9] From 2013 onward, the variable reflects the ratio of pupils having immigrated within the last four years, replacing two earlier variables on the origin of pupils and parents.

[10] We can examine solutions that are closer to the definition of low performance traditionally used in U.S. literature (absolute/unadjusted for SES) as well as relative underperformers (based on SES-adjusted data). This allows us to derive contextualised nuanced solutions applicable to a wider range of schools.

demographics due to, for instance, neighbourhood gentrification. We choose the percentage of pupils achieving at least a pass grade in all subjects over the alternative of student grades in order to minimise the issue of grade inflation – which in Sweden is more prevalent in the top grades (Henrekson & Wennström, 2022).

Turnaround and non-turnaround schools

All conditions in this study are operationalised as "crisp sets", meaning that schools are either in or out of any particular condition (Ragin, 2009). For the outcome condition, this means that a school either achieves a turnaround or it does not. To operationalise the definition of school turnaround, we begin with the identification of underperforming schools. While poorly performing schools have been the subject of ongoing policy debate and media attention, particularly highlighted by Sweden's disappointing results in the PISA rankings of 2012 and 2015 (OECD, 2012, 2015), the Swedish policy context lacks a formal definition of low-performing schools. We choose to use the lowest performance quartile of schools – i.e., the 25 per cent worst-performing schools, which is a benchmark used by the Swedish School Inspectorate (2021) to identify schools with persistently poor academic results.

Utilising data spanning the years 2008–2019, we calculate a five-year centred moving average of the SES-adjusted performance of each school for the period 2010–2017. Since the raw data for the moving average performance is based upon a residual from an OLS regression that normalises pupil performance based on pupil demographics of 1442 schools (Swedish National Agency for Education, 2022), it has a median close to 0 (0.6), and the threshold for the lowest quantile is at -3.2. As the outcome variable is based on the percentage of students passing all subject grades in ninth grade, the absolute distance between the two thresholds is approximately 3.8 percentage points, which translates to approximately another seven to nine students passing all subjects for a school with around 200 students in lower

secondary school. Setting the thresholds for the median and quartile that define our sample based on moving average values has the advantage that is places less weight on extreme values, which helps us capture sustained changes in school performance rather than short-term fluctuations in pupil achievement, aligning with the recommendations of school improvement and turnaround research (Jarl, Blossing, et al., 2017; Murphy & Meyers, 2007).

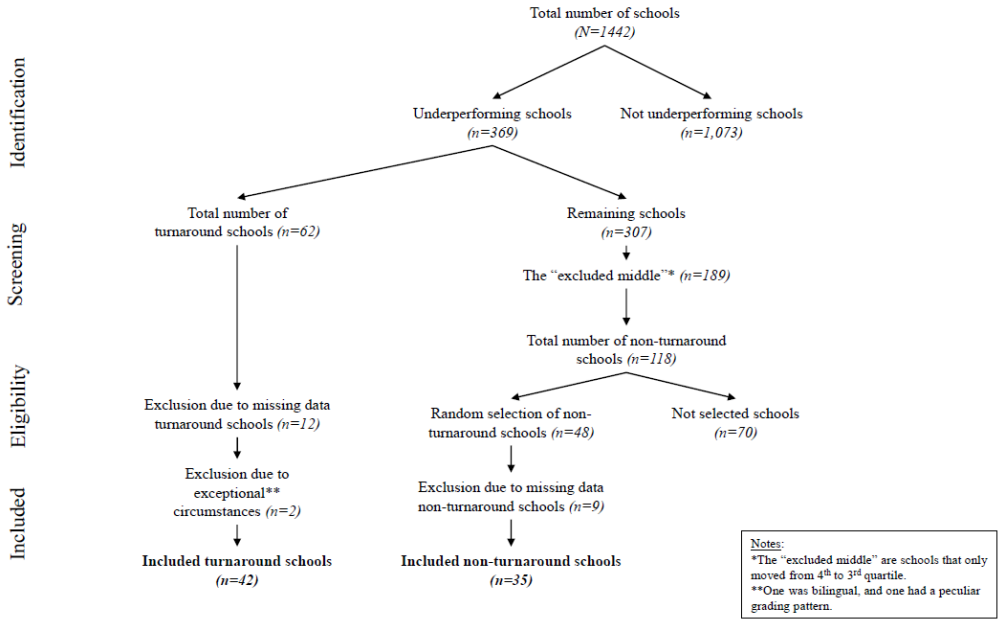
Schools are categorised as *underperforming* if their moving average value falls within the lowest quartile for at least two consecutive years between 2010 and 2015, indicating a prolonged period of underperformance spanning potentially six to nine years from 2008 to 2017. To ensure the continuity and relevance of our measure, we focus on schools that maintained active educational programmes throughout the period and we excluded those that existed for fewer than five years between 2008 to 2019. In total we have a sample of 1442 schools (Swedish National Agency for Education, 2022). Of these 1442 schools, 369 were identified as underperforming – i.e., approximately 25 per cent.

Within this group of underperforming schools, we calibrate *turnaround schools* as schools that transition from the lowest quartile to performing above the median. Specifically, a school is calibrated as a turnaround case when it *achieves a moving average value above the median for at least two consecutive years* between 2013–2017 – capturing a six- to eight-year period from 2011 to 2019 because of the way that moving averages are calculated. Of the 369 underperforming schools, 62 met our criteria for turnaround – that is, roughly 18 per cent of all underperforming schools managed to turn around according to our operationalisation.

To provide a comparison group, we select an equivalent number of non-turnaround schools. These are consistently underperforming schools that function as a type of control group. For this group, we use data from 2014–2019 to identify schools that remained in the lowest quartile throughout the period. Since cases in a crisp-set QCA always are fully in or out of a condition, calibrating the negation of the outcome inevitably involves adhering to the

"rule of the excluded middle" (Oana et al., 2021). This means that in order to reduce ambiguity in the calibration of a school turnaround, we exclude schools that only transitioned from the fourth (lowest) to the third (second lowest) performance quartile. This exclusion of the middle results in 118 non-turnaround schools, constituting approximately 32 per cent of all underperformers. To maintain intimacy with our cases and a balanced sample of turnaround and non-turnaround schools, we randomly select 48 schools from the group of 118 continuously underperforming schools. This results in a sample of a total of 110 schools with a ratio of 56 per cent turnaround schools to 44 per cent non-turnaround schools. However, when matching schools with survey data for the causal conditions, we encountered some issues with missing data. As a result, we were obliged to exclude 12 turnaround and nine non-turnaround schools. Additionally, two more turnaround schools were excluded due to exceptional circumstances. One was a bilingual school, and the other had a peculiar grade pattern with a significant drop one year. These were removed as they were considered non-representative of the sample. This leaves us with a final sample of N=77 schools, comprising n=42 turnaround schools and n=35 non-turnaround schools. A flow chart of the sample selection process is provided in Figure 1 below.

Figure 1. Flow chart of the sampling process



Calibration of conditions

The data for calibrating the causal conditions was collected from several public sources: the Swedish School Inspectorate's teacher and pupil survey (Swedish School Inspectorate, *Statistik från Skolenkäten*, 2020), the School Inspectorate's regular inspection visits to schools and school districts (Swedish School Inspectorate, *Statstik från regelbunden tillsyn*, 2020), the Swedish National Agency for Education (2020) and the Swedish Association of Local Authorities and Regions (2021).

When calibrating the conditions, we drew upon a mix of theoretical knowledge from previous literature, one author's expert knowledge of the Swedish school system, archival material from the Swedish School Inspectorate and interviews and discussions with nine experienced teachers, principals and school administrators.

We calibrate *Teacher Collaboration*, *Principal's Focus on Core Operations* and *High Academic Expectations* in similar ways, as the data for these conditions come from the same mandatory annual surveys (Swedish School Inspectorate, *Statistik från Skolenkäten*, 2020) that collect responses from teachers and pupils using a Likert scale. Responses were normalised into an index score by the Inspectorate, which is the school-level average, evenly distributed at 0, 3.33, 6.66 and 10 between the four options used to calculate the index score (fully agree=10, partially agree=6.66, partially disagree=3.33 and fully disagree=0). Since the outcome variable (school turnaround) is measured as change over time, our explanatory conditions should be expected to exhibit variation over time (Fullan, 2007; Kim et al., 2018; Leithwood et al., 2010; Murphy & Meyers, 2007). For instance, if perceptions of the principal change such that they are no longer seen as neglecting core operations but actively focusing on them instead, this change would suggest a potential reason for a turnaround. Yet, as QCA conditions can work in conjunction with other conditions, a condition that does not change can still be important when combined with a change in another condition. Thus, we

operationalise the conditions *Teacher Collaboration*, *Principal's Focus on Core Operations* and *High Academic Expectations* as either an increased score over time (*change*) or as a consistently high score over time (*state*) (Gresov & Drazin, 1997; Sebastian et al., 2014). To be classified as *change*, the index score had to increase at least 0.666 between the first and last observations. This means that at least a 20 per cent of teachers increase their response by one step on the Likert scale, which is substantial enough to indicate actual change. In calibrating *state*, the average index score had to be above 8.335 for all observations. 8.335 is also the crossover point where respondents, on average, are closer to "fully agree" than "partially agree" for the survey item. Our analytical procedure hence does not distinguish between change and state in a particular condition, but rather highlights what conditions and combinations thereof lead to a successful school turnaround.[11]

School District Quality Assurance is calibrated using data from the Swedish School Inspectorate (*Statstik från regelbunden tillsyn* 2020) regular reports on systematic quality work. We use the survey item indicating *whether or not the school district in question is assessed to be working sufficiently with systematic quality assurance*, which is a binary assessment by the Inspectorate. Since this variable has fewer observations than the teacher and pupil surveys, we choose to operationalise it only as a *state* condition. We use the latest observation from the inspectorate in order to stay as close to the turnaround time as possible.

Change Pressure is a contextual condition constructed from publicly available data from the Swedish National Agency for Education (2020) on the share of pupils who leave compulsory schooling with complete grades, making them eligible for upper secondary school. This threshold determines access to further education and is commonly reported in the media and assessed by decision-makers as a critical measure of success. Schools with a large

[11] In Online Appendix 10, we summarise the results of an additional analysis that removes the *state* and *change* dimension to the conditions, examining which operationalisation contributes more or less to the QCA solutions.

share of pupils finishing elementary school without complete grades are commonly seen as underperforming (Swedish School Inspectorate, 2021) and occasionally appear in the media as "the worst schools in Sweden" (The Local, 2021). We operationalise this condition as a crisp set based on the average ratio of pupils leaving ninth grade with complete grades in 2008–2014. The threshold chosen was 90 per cent, equal to the national average of 90.43 per cent. The variable is thus a proxy for the external pressure from authorities, parents, media, or other stakeholders that may arise from underperforming in absolute numbers. For example, in a school with 90 per cent of pupils or fewer with complete grades, this means a "failure rate" of at least 1 in 10 pupils over a substantial period, which is likely to have a symbolic meaning for external stakeholders.

We also construct an additional contextual condition by splitting the sample into *Urban* and *Non-Urban* subsamples by using the general categorisation of Swedish municipalities into nine typologies depending on population size and commuter patterns (Swedish Association of Local Authorities and Regions, 2021). As mentioned earlier, Swedish schools compete for students through a universal voucher system. However, some municipalities have only one or very few schools, reducing or voiding competition (Edmark, 2019; Jarl, Blossing, et al., 2017). The relevant variation we want to capture is population density (as a proxy for school competition) and commuting patterns related to the supply of teachers and pupils, approximating organisational capacity and ease of reorganisation. An urban municipality either 1) has a population of at least 50,000 inhabitants, of which at least 40,000 live in the municipality's largest city, or 2) at least 40 per cent of the population commute daily to one of Sweden's three largest cities: Stockholm, Gothenburg, or Malmo. The remaining municipalities are categorised as "non-urban municipalities". The data sources and calibration for each condition are summarised in Table 1.

Table 1: Conditions Summarised.

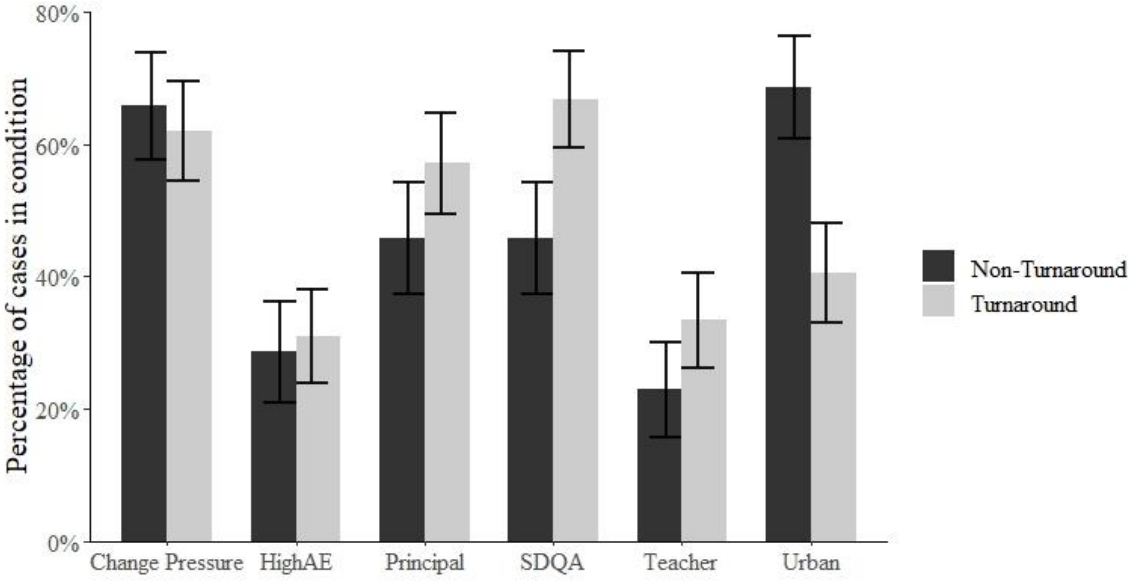
Condition	Scale	Years	Source	Change/State	Calibration
Teacher Teacher Collaboration	0-10	2010-2019	Annual teacher survey, The Swedish School Inspectorate (SSI)	Change and State	Crisp set: Change of 0.666 between first and last values, or value above 8.335
Principal Principal's Focus on Core Operations	0-10	2010-2019	Annual teacher survey SSI	Change and State	Crisp set: Change of 0.666 between first and last values, or value above 8.335
HighAE High Academic Expectations	0-10	2010-2019	Annual pupil survey SSI	Change and State	Crisp set: Change of 0.666 between first and last values or value above 8.335
SDQA School District Quality Assurance	Dummy, 1 or 0	2012-2019	The SSI's inspection reports of school districts	State	Crisp set: Latest inspection report
Change Pressure (contextual)	0-100 %	2008-2012	Share of pupils eligible for upper-secondary school (Register data, Swedish National Agency for Education)	State	Crisp set: Under the median value of 90 %
Urban/Non-Urban (contextual)	Municipality type (9 categories)	2017	Swedish Association of Local Authorities and Regions (SKR)	State	Crips set: Urban = Metropolitan, commuter to metropolitan + large/medium-sized towns Non-Urban = Rural, small towns + commuter to large/medium-sized towns

All conditions are calibrated as crisp sets. To verify our choice of a crisp set analysis, we explored the stability of our findings in relation to changes in the calibration of our different conditions (see Online Appendix 7). These additional analyses suggest that our findings are not particularly sensitive to the exact calibration of conditions, which gives us some confidence that a fuzzy-set QCA would give broadly similar results.

Figure 2 shows the distribution of causal conditions among the turnaround (lighter bars) and non-turnaround (darker bars) schools, indicating sufficient variation across all conditions – i.e., the presence/non-presence of the condition is no more skewed than a 20/80 ratio as per the rule of thumb in Oana et al. (2021). Most turnaround schools are in the set of schools where either or both of the conditions *Principal's Focus on Core Operation* and *School District Quality Assurance* are present, while *Teacher Collaboration* and *High Academic Expectations* are rarer. Most turnaround schools in our sample are in non-urban

municipalities, with approximately 40 per cent of the schools in urban municipalities (the national average is approximately 34 per cent). Finally, it is interesting to note that although about 60 per cent of schools in our sample are subject to change pressure in terms of absolute performance, about 40 per cent of turnaround schools are not visibly underperformers compared to the national mean. Such underperformers might have gone unnoticed if SES-adjusted data had not been utilised. For detailed descriptive statistics, see Online Appendices 1 and 2.

Figure 2: Percentage of cases being present in condition per outcome.



Note: Mean standard errors are displayed as error bars. Most conditions do not have statistically significant differences between the means except for Urban, where the means are significantly different at the 5 per cent level. The School District condition is significantly different at the 10 per cent level.

Results

We perform the analysis in four steps. First, we examine a baseline set of solutions for the four conditions on the entire sample. Second, we add the contextual condition *Change Pressure*. These first two steps are taken to provide a reference point for the further sets of solutions and to examine the effect of adding contextual nuance in the form of *Change Pressure.* We then add the second contextual condition by splitting the sample into urban/non-urban subsamples for further contextual nuance. In the fourth and final step, we examine the negation of the outcome, i.e., the failure to turn around, analysing what conditions hinder schools from turning around. This is considered standard QCA practice (Oana et al., 2021; Schneider & Wagemann, 2012) and is necessary as we should not assume symmetrical causation (i.e., that the absence of a condition gives the opposite effect to its presence).

In each analysis, we investigate the conditions or combinations of conditions that are necessary and/or sufficient for the outcome. None of the conditions is necessary for school turnaround, whether alone or in combination – that is, *no conditions or sets of conditions are always present whenever we observe a turnaround.* For details on the necessity analysis, see Online Appendix 3.

As the analysis yielded no necessary conditions, we proceeded with analysing sufficient conditions (conditions whose presence means that the outcome will always be present). This is done through a minimisation process to present solutions that are as simple as possible (Ragin, 2000; Schneider & Wagemann, 2012). The analysis yields combinations of conditions[12] that are sufficient for the outcome. We assess the solutions in terms of

[12] A sufficient combination of conditions consists of INUS conditions, i.e., *insufficient* conditions for the outcome but a *necessary* step of a combination that is *unnecessary* but *sufficient* for the outcome.

consistency[13] and coverage[14]. For details on the QCA minimisation algorithm employed in this study to reduce the cases to solutions, see Online Appendix 12.

Analytical Step 1 constitutes the baseline solution set for examining sufficient conditions for predicting school turnaround in the entire sample, based on the conditions *Teacher Collaboration, Principal's Focus on Core Operations, High Academic Expectations* and *School District Quality Assurance*. It is presented in Table 1 below. The rows indicate solutions resulting from the minimisation process that generates the simplest solutions possible – in terms of the presence or absence of conditions – that lead to the outcome (Schneider & Wagemann, 2012). Each row can be considered a "recipe" that leads to the outcome of a turnaround. The first four columns (1–4) in Table 1 indicate whether a condition is present or absent in the solutions. Each condition's presence is indicated by "●" and its absence by "Ɵ". If a condition's absence or presence is irrelevant to a specific solution, this is denoted by a blank space. The "●" and "Ɵ" vary in size, indicating whether the condition is core or contributory to a solution.[15]

Columns 5–9 present different descriptives of the solution, including solution coverage, raw coverage, unique coverage and solution consistency. Only cases with high consistency, i.e., above 0.8, (Oana et al., 2021; Schneider & Wagemann, 2012) are displayed. The final two columns display each solution's unique and raw number of cases based on solution coverage. Our analysis focuses on solutions with more than one unique turnaround case, indicated by the dotted line in each table.

[13] *Consistency* is the per cent of cases in a configuration that leads to the outcome.
[14] *Coverage* is the per cent of cases out of all cases in the configuration.
[15] A core condition is an ISUN condition that still appears as an ISUN condition under different assumptions in the minimisation process dealing with combinations of conditions not empirically observed using all 'logical remainders' (not empirically observed combinations of conditions) as per the parsimonious solution or using directional expectations (theory-guided decisions) to determine which logical remainders should be included in the intermediate solution.

Table 1: Sufficient baseline solution sets (without contextual conditions).

Teacher	Principal	HighAE	SDQA	Raw coverage	Unique coverage	Consistency	Raw Cases (N)	Unique Cases (N)
	⊖	●	●	0.167	0.143	1	7	6
●	●	⊖	⊖	0.119	0.119	0.833	5	5
●	⊖		●	0.048	0.024	1	2	1
⊖	●	●	⊖	0.024	0.024	1	1	1
					Solution coverage	**Solution Consistency**		
					0.333	0.933		

The baseline solution set only explains a moderate number of school turnarounds in the entire sample. With a solution coverage of 0.333, the explanatory power is relatively weak (Oana et al., 2021), as only a third of the turnaround instances can be explained by this solution set. However, two solutions stand out. The first is a combination of the presence of *High Academic Expectations* and *School District Quality Assurance* and the absence of *Principal's Focus on Core Operations.* Since this solution is perfectly consistent and has a relatively high coverage (seven cases), it is empirically relevant. An interpretation of this solution is that active support from the school district and a belief in pupils' ability is sufficient for a turnaround, even without a principal who is focused on core operations. High academic expectations may indicate a well-functioning culture at the school level, which can be accompanied by active quality assurance from the school district in driving change (c.f. Jarl, Blossing, et al., 2017). The second solution combines *Principal's Focus on Core Operations* and *Teacher Collaboration* and the absence of *High Academic Expectations* and *School District Quality Assurance.* This configuration explains slightly fewer cases (five) but represents an alternative path to turnaround involving only school-level factors. Possibly these two solutions can be interpreted as suggesting a substitution between functional leadership at the school or district level.

Analytical Step 2: A possible confounding factor in our baseline solution set is that we mix schools that perform poorly in absolute terms with those that perform poorly based on the SES-adjusted values. This may be problematic if these represent two different types of struggling schools – those that are seen as "problem schools" and those not generally regarded as such. Hence, we introduce the contextual condition *Change Pressure* to proxy how well the school performs in absolute terms, unadjusted for SES (the Truth Table for Analytical Step 2 is provided in Online Appendix 4). We approach this in an exploratory manner, with no ex-ante expectations on how it may impact the conditions for school turnaround. It may have asymmetrical effects, which makes it suitable to add to the QCA. The results of this analysis, presented in Table 2, yield several sufficient combinations.

Table 2: Sufficient baseline solution sets with contextual conditions.

Row	Change Pressure	Teacher	Principal	HighAE	SDQA	Raw coverage	Unique coverage	Consistency	Raw cases (N)	Unique cases (N)
1	●	●	●	⊖		0.214	0.119	0.818	9	5
2			⊖	●	●	0.167	0.095	1	7	4
3	⊖	⊖	●	⊖	●	0.071	0.071	1	3	3
4	●	●	•		●	0.119	0.024	0.857	5	1
5	⊖		⊖	●		0.095	0.024	1	4	1
6	⊖	●	⊖		●	0.048	0.024	1	2	1
7	•	⊖	●	●	⊖	0.024	0.024	1	1	1
							Solution coverage	**Solution Consistency**		
							0.548	0.92		

Adding *Change Pressure* to the analysis improves the solution coverage substantially, from 0.333 in Table 1 to 0.548 in Table 2. In other words, this solution set can explain more than half of the turnaround cases. It also adds nuance to the QCA model, as there are now three empirically relevant solutions out of seven, compared with two out of four in the baseline solution set. These are similar to the earlier ones, highlighting either *Principal's Focus on Core Operations* and *Teacher Collaboration* or, alternatively, *High Academic Expectations* and *School District Quality Assurance* as core conditions.

In the first solution (row 1 in Table 2), where teachers collaborate to a large extent and the principal focuses on the school's core operations, we also see the condition *Change Pressure* present. An interpretation of this is that for actors at the school level (teachers/principals) to initiate a turnaround process, the school must be visibly underperforming, not only relative to the SES of pupils. Nor is it surprising that teacher collaboration and a principal focusing on core operations appear in conjunction, considering the significant role the principal plays in facilitating a collaborative environment (García-Martínez et al., 2021). We refer to this as a type of *bottom-up turnaround* as it is initiated and driven at the school level.

In the second solution (row 2), where the school district engages in quality assurance and there are high academic expectations of pupils, the *Change Pressure* condition is irrelevant; its presence or absence makes no difference to the outcome. This suggests that where there is no external pressure to change (i.e., no visible underperformance), turnaround may need to be initiated "from above" (i.e., by the school district). Here, heightened academic expectations of pupils combined with a school district that conducts systematic quality assurance is sufficient for school turnaround even without any pressure to change. Our interpretation is that a turnaround requires efforts at the school level, and in the absence of external pressure, such efforts may not be initiated. However, the school district can function as an external agent of change that identifies problems even in those schools that superficially seem unproblematic and thus substitute the pressure for change stemming from visible underperformance. In this solution, there seems to be a gap in the vertical governance chain, as the principal does not focus on core operations. As Adolfsson and Alvunger (2020) discuss, it might be possible for the school district to bypass the principal, who may be acting as a gatekeeper (shielding the organisation from "external influence" rather than focusing on core

operations) and initiate change with the help of, e.g., expert teachers. We refer to this as a *bypass turnaround*.

The third empirically relevant solution (row 3) is where *School District Quality Assurance* and *Principal's Focus on Core Operations* are present while *Teacher Collaboration, High Academic Expectations* and *Change Pressure* are absent. Here, both leadership functions are active and possibly synchronised due to additional organisational slack enabled by the lack of external pressure. When the principal's autonomy is not explicitly threatened, there is less risk of project crowding, and thus they have less reason to gatekeep the organisation (Adolfsson & Alvunger, 2017, 2020). We refer to this type of turnaround as a *leeway turnaround*. Bottom-up, bypass and leeway turnarounds constitute the three main solutions in the entire sample.

Analytical Step 3: To provide a more contextually nuanced analysis of the conditions for school turnaround, we repeat the analyses on subsamples of urban and non-urban schools. Considering schools' context, and specifically their geographical setting, has proven important in previous Scandinavian studies (Jarl, Blossing, et al., 2017).

Table 3: Sufficient solutions for the urban / non-urban subsamples.

Table 3a URBAN SCHOOLS

Row	Change Pressure	Teacher	Principal	HighAE	SDQA	Raw coverage	Unique coverage	Consistency	Raw cases (N)	Unique cases (N)
1	⊖		⊖	●		0.176	0.176	1	3	3
2	⊖	⊖	●	⊖	●	0.118	0.118	1	2	2
3	⊖	●	⊖		•	0.059	0.059	1	1	1
4	●	●	•	●	•	0.0589	0.059	1	1	1
5	●	●	•		⊖	0.0589	0.059	1	1	1
							Solution Coverage	**Solution Consistency**		
							0.471	1		

Table 3b NON-URBAN SCHOOLS

Row	Change Pressure	Teacher	Principal	HighAE	SDQA	Raw coverage	Unique coverage	Consistency	Raw cases (N)	Unique cases (N)
1	ϴ					0.28	0.2	1	7	5
2		●	●	ϴ		0.24	0.16	0.857	6	4
3			ϴ	•	●	0.2	0.16	1	5	4
4			•	ϴ	●	0.24	0.12	1	6	3
5		ϴ	•	●	ϴ	0.04	0.04	1	1	1

Solution Coverage	Solution Consistency
0.84	0.955

The solution coverage for the urban schools shown in Table 3a is lower than for the entire sample (0.471), which suggests that finding parsimonious turnaround recipes is more difficult in an urban context. The solutions identified in Table 3a have relatively limited coverage; the solution with the broadest coverage includes only three cases. This solution is based on the absence of *Change Pressure, Principal's Focus on Core Operations* and *High Academic Expectations*. In previous models, all empirically relevant solutions with *High Academic Expectations* have included the presence of either *Principal's Focus on Core Operations* or *School District Quality Assurance* as contributory conditions. In an urban context where the school is not a directly visible underperformer (i.e., it only performs poorly in relation to the SES of its students), turnaround is made possible by simply raising academic expectations. In other words, schools with relatively high SES in urban contexts may be more responsive to increasing academic expectations. The second solution (row 2) in Table 2 is more similar to the *leeway turnaround* identified in the entire sample, with strong leadership from both the principal and the school district. We can also see from one of the empirically small solutions (i.e., few cases covered) that a *bottom-up* approach is possible, though not very common. Below, we speculate on the possible reasons for these differences.

There are several potential explanations for why several small-coverage solutions appear in the urban sub-sample. The result may indicate noisy data or a more significant variation in the causal pathways for school turnaround in urban settings. Most probably, there

are also essential differences between urban and non-urban areas as contexts for schools that seek to turn their performance around. In urban settings, teacher turnover is more common (Borman & Dowling, 2008; Guarino et al., 2006)[16], social segregation is greater (Böhlmark, Holmlund, et al., 2016) and there is greater competition between schools (Edmark et al., 2014). The organisational capabilities of school districts may also differ between urban and non-urban settings. We might expect school districts in urban settings to have greater resources, while on the other hand, they are less able to focus on a single school, as they cover multiple schools.

The solution coverage for non-urban schools in Table 3b is high (0.84), meaning that the model explains more than 80 per cent of the turnaround cases with the five solutions presented as rows in the table. This is markedly higher than the solution coverage for the urban sub-sample (0.471), indicating that schools in small towns and rural communities represent a more easily predictable context for school turnaround.

For non-urban schools, the absence of *Change Pressure* seems to constitute a single sufficient condition. This is markedly different from the entire sample (Table 2), where the absence of *Change Pressure* had to be accompanied by strong leadership at the school and/or district level. In contrast to the other conditions for which we have prior evidence in the literature, finding that merely performing relatively well in absolute terms constitutes a condition for school turnaround is interesting but challenging to explain.[17] One possible explanation is that it may be easier for schools with relatively better results as a starting point to improve than for schools that begin their journey at the very bottom. Another explanation

[16] Excessive teacher turnover has been shown to suppress the positive effect of school turnaround efforts (Henry et al., 2020).

[17] Running the analysis without *Change Pressure*, we get a similar solutions coverage at 0.8, but with *School District Quality Assurance* as the core condition, covering at least 50 per cent of solutions explaining turnaround. Out of the seven cases with an absence of *Change Pressure*, six also have *School District Quality Assurance* present. As the solution coverage is weaker and only one case differs between the solutions where *Change Pressure* and *School District Quality Assurance* are absent, the solution with only the absence of *Change Pressure* may be irrelevant; it could be that an absence of *Change Pressure* must be coupled with *School District Quality Assurance.*

may be that the pupils in such schools can draw on a wider range of resources more easily, such as receiving help from parents, which may lead to a turnaround without the school changing very much. These are, however, only speculations.

The remaining solutions for non-urban turnarounds in Table 3b (rows 2–4) suggest a pattern similar to the analysis of the entire sample (Tables 1 and 2), with conditions fulfilled at the school or district level. However, the school district's effect seems more critical in non-urban schools. One possible explanation is that it is harder to recruit teachers and principals in non-urban contexts (Goldhaber et al., 2020) and that the presence of school district quality assessment can make all the difference in supporting and directing struggling schools. Also, in non-urban contexts, the school district often has fewer schools to focus on and could thus tailor efforts to specific schools.

Analytical Step 4: We next turn our attention to the negation of the outcome, i.e., the causal conditions that hinder school turnaround (Schneider & Wagemann, 2012). Note that the non-turnaround schools in our sample have low levels of pupil performance similar to those of the turnaround schools, but do not manage to improve their performance. We treat this as a separate analysis as we cannot assume symmetric causality, i.e., that the absence of the conditions would mean the absence of school turnaround.

Table 4: Sufficient solutions for the negation of the outcome.

Row	Change Pressure	Teacher	Principal	HighAE	SDQA	Raw coverage	Unique coverage	Consistency	Raw cases (N)	Unique cases (N)
1	●	⊖	⊖		⊖	0.257	0.257	0.9	9	9
2	●	⊖	●	●	●	0.114	0.114	0.8	4	4
3		●	●	●	⊖	0.057	0.057	1	2	2
4	⊖	●	●	⊖		0.029	0.029	1	1	1
							Solution Coverage	**Solution Consistency**		
							0.457	0.889		

The sufficiency analysis in Table 4 explains almost half of the non-turnaround cases, i.e., somewhat lower than the sufficiency analysis of turnaround schools in Table 2. Three solutions explaining non-turnarounds stand out. The first solution (row 1) in Table 4 explains about a quarter of all non-turnaround schools, based on the absence of the conditions *School District Quality Assurance, Principal's Focus on Core Operations* and *Teacher Collaboration,* with the presence of the contextual condition *Change Pressure.* This solution could be thought of as a leaderless and unsupported school with an individualistic teacher culture that is also visibly failing in terms of pupil outcome. This recipe for failure resonates with Jarl, Blossing, et al. (2017), who unsurprisingly found that unsuccessful Swedish schools were characterised by teachers who were not collectively organised and school leadership that neglected pupil achievement.

A more surprising finding is that the other two empirically relevant solutions have more conditions present than absent, which is somewhat contradictory to our theoretical expectations. There are, however, some possible explanations for why these schools fail to turn around despite fulfilling some conditions. One is that the absence of *Teacher Collaboration* (row 2) is of particular importance for explaining non-turnaround schools, as this is a commonality across both the first and second solutions. In other words, a lack of teacher collaboration may indicate that the school's work environment is so poor that turnaround is unviable, even though leadership resources are in place. In the third solution (row 3), the school may have "bet on the wrong strategy" by implementing ideas that the school district fails to control. For example, one of the schools interviewed in the solution rejected homework entirely[18], which may be a disadvantage relative to other schools.

[18] We discovered this from a news article about the school in media archives.

Robustness tests

First, we examined the performance trajectory, which showed that the turnaround schools in our sample continuously improve from the start of the turnaround process to its end, making it impossible for a change in a condition to postdate completion of the turnaround process, i.e. minimising the risk of 'reversed causality' (see Online Appendix 5). We also perform several robustness tests of the entire sample (Table 2) to examine the sensitivity of the general conclusions under different assumptions. As the calibration of conditions requires making several decisions, some based on earlier work and others on expert knowledge, and because there may be measurement difficulties, it is standard practice to test alternative assumptions. To test the sensitivity of our choices made when constructing the Truth Table and running the minimisation algorithm, we altered the (i) consistency thresholds from 0.8 to 0.84 and 0.67 and the frequency cut-offs for including a solution from 1 to 2 or 3; (ii) we changed the calibration of conditions; and (iii) we randomly corrupted and deleted cases. We also analysed the robustness of our analysis by changing the thresholds used to define the sample of turnaround schools. We further analysed the effect of dropping *state* (consistently high value) or *change* (substantial change to value) as part of the calibration. All robustness tests are available in Online Appendices 5-10. Overall, our analysis is robust to changes in consistency thresholds, frequency cut-offs, changes in the threshold used to define turnaround schools and to dropping *state* or *change* in the calibration of conditions. The analysis is also robust to corruption of cases and changes to the calibration of *Change Pressure* but more sensitive to corruption and changes to *Principal's Focus on Core Operations* and *High Academic Expectations*. These sensitivities suggest that 15–20 percentage points might overstate solution coverage under certain assumptions, and some of the conditions may correlate to the point that they may be interchangeable in some respects.

In-depth interviews

We complement the QCA with in-depth interviews with school leaders (principals, deputy principals and school district leaders). The interviews were carried out in parallel with the QCA analysis to enable a deeper understanding of the causal conditions posited[19]. It was thus not meant as a full qualitative study aimed at generating new understandings of turnaround processes. To minimise potential "recall bias" (Golden, 1992), we organised the interview questions around facts and event sequences (Glick et al., 1990) and asked respondents to reflect on the state of the school at the time of the low performance and ongoing events in its subsequent development. In this way, we aimed to obtain descriptions of how interviewees experienced the turnaround process over time. As we were asking about a consequential event in their career – most turnaround attempts involve considerable work and attention – we are not very worried that our respondents would not recall the relevant events. In no interviews were there such issues. Whenever possible, we relied on archival documents and data from the School Inspectorate to triangulate informants' descriptions of key events. We could do this best with respect to the timing of the turnaround (using data from the school inspectorate) and the conditions present or absent (using data from the surveys). The most difficult aspect to triangulate was whether there was an explicit turnaround strategy, as we lacked a systematic data source for this information.

We have three motivations for conducting these complementary interviews. First, we want to test the face validity of our conditions with the main actors involved in school turnaround. Second, we want to examine more in-depth cases that do not fit neatly into the

[19] Written informed consent was obtained from all participants prior to the interviews, and all recordings and transcripts of interviews were anonymised. Swedish regulations only require formal ethics approval for research involving sensitive information about the participants or information about legal violations. As no such information was collected, ethics approval was not required.

QCA solutions (more below). Third, we want to explore potential unobserved conditions that we may have overlooked or failed to pick up from earlier literature. An interplay between the empirical QCA model and contextual insights gained from interviews allows us to refine our understanding of causal conditions for school turnarounds in the empirical context studied (Ragin, 2009; Schneider & Wagemann, 2012).

Table 5 summarises the schools sampled for interviews along two dimensions: turnaround and non-turnaround schools, with or without conditions present. The logic is that where conditions are present and the school makes a turnaround, the face validity of our conditions may be confirmed. If leaders of turnaround schools with conditions fulfilled speak of their turnaround resulting from these conditions, we regard this as a validation of the conditions. Conversely, where the conditions are absent and the school does not turn around, we expect school leaders to speak of the lack of these conditions as the reason for non-turnaround. Although QCA does not assume symmetric causality, earlier literature (Jarl, Blossing, et al., 2017) suggests that the absence of conditions could be detrimental to turnaround. Yet, the anomalies, i.e., cases where conditions are present yet there is no turnaround, or conversely, where no conditions are present yet there is a turnaround, are interesting from an exploratory perspective: how can these be explained?

Table 5: Interviewed Schools.

	Turnaround	**Non-turnaround**
Conditions present	School A School B	School D
Conditions absent	School E School F School G	School C

Schools A, B and C, by and large, validated our conditions. Informants at schools A and B spoke of high expectations and teacher collaboration as vital factors for their turnaround. The interviewees also discussed factors such as pupil wellbeing and the school's

financial resources. These may, however, be context-specific challenges of these two schools. In school C, a non-turnaround school lacking all conditions, the principal highlighted the lack of teacher collaboration and rapid principal turnover as reasons for continuous poor performance. Over eight years, no fewer than six principals had passed through the school. Under such conditions, it is unsurprising that few conditions are fulfilled and there is no turnaround.

We received more heterogenous answers for the other schools in the secondary diagonal (D, E, F and G). Informants at school D spoke about the substantial effect of the absence of teacher collaboration, even when all other factors were in place (*Change Pressure*, *Principal's Focus on Core Operations*, *High Academic Expectations* and *School District Quality Assurance* present and *Teacher Collaboration* absent for school D). The principal described the school as being "on a change path", just as the conditions indicate, but admitted that there was resistance from some teachers that thwarted the process. This illustrates the critical role of teachers and teacher collaboration in turning around schools, echoed in the negation analysis (Analytical Step 4), where the absence of *Teacher Collaboration* was identified as a single sufficient condition for non-turnaround.

Regarding schools E, F and G, we find that case-specific factors could explain their turnaround. School E's turnaround may have been due to an external state-funded school development programme and a significant reorganisation. School F may have managed to turn around because of powerful and charismatic principal leadership, despite lacking all other conditions. It is further possible that School G turned around due to a radical shift in school culture. As at school D, there was initial resistance from parts of the teacher collective. However, many of these teachers resigned within the first two years of the turnaround process, which, according to the principal, cleared the way for the turnaround. All these factors highlight the multiple paths to turnaround and specific cases unsuitable for

generalisation beyond the individual school. Further details regarding case-specific conditions and summarised details about the interview cases can be found in Online Appendix 11.

Discussion

Motivated by the scattered evidence on strategies and factors facilitating the potential for turning around poorly performing schools in school improvement research, this study set out to identify the necessary and sufficient conditions for school turnaround in Sweden, a country that has seen reports of increasing quality division in school performance (Edmark et al., 2014; Holmlund et al., 2019). Employing comparative analysis (QCA) and detailed hand-collected data on 42 turnaround schools and 35 non-turnaround schools, we advance the understanding of how schools turn their fortunes around.

Firstly, we find no silver-bullet solution to improve struggling schools. Instead, we identify three more prevalent recipes for turnaround: a *bottom-up turnaround,* where teachers actively collaborate and the principal has a strong focus on the school's core operations, and a *bypass turnaround*, where the school district (the municipality) works actively on quality assurance in combination with teachers' high academic expectations of pupils. In the third recipe, *leeway turnaround*, both school district quality assurance and principal leadership are in place, but there is no pressure to change. In the absence of any external pressure or immediate threat to their autonomy, schools may be able to work in peace, patiently and persistently maintaining their current efforts without trying to overcome challenges by taking on new development programmes or initiatives (project crowding). The lack of external pressure may also give principals less reason to gatekeep the organisation.

We also explore and find recipes for the conditions that cause non-turnaround. In particular, the absence of teacher collaboration stands out as a prevalent condition that marks consistently underperforming schools. Corroborating and building upon the findings in Jarl,

Blossing, et al. (2017), the absence of teacher collaboration is a characteristic not only of underperforming schools but also of consistent underperformers.

While there is no silver bullet that guarantees success, a possibly more important finding is that there may be several pathways to success. Schools *need not tick all the boxes* suggested by earlier research. Leadership from the principal and the school district are essential, but not necessarily in combination. Another important finding is that although teacher collaboration does not guarantee success, it remains a significant obstacle for school turnaround if left unattended or dysfunctional. A final central finding is that *context matters*. Schools in non-urban contexts could achieve a turnaround by promoting a collaborative culture among teachers, whereas teacher collaboration appears less central to school turnaround in the urban subsample (Borman & Dowling, 2008; Guarino et al., 2006). In urban settings, the conditions for turnaround are more complex, meaning that more tailor-made solutions might be required.

Contributions to educational research

Our paper offers contributions to educational research that seeks to study causal relationships. For decades, such research has struggled to account for the complexity of extra- and intra-organisational processes (Hallinger & Heck, 1998; van Der Steen et al., 2013) and the importance of context (Meyers & Smylie, 2017). Using QCA to probe the causal conditions underlying school turnaround reveals several different causal pathways for underperforming schools to turn around, acknowledging the context-specificity of such causal pathways. This type of analysis offers new avenues for educational research, including but not limited to school turnaround and school improvement research. For example, school improvement research may seek to unearth other contextual differences beyond the urban/rural within the

framework developed in the current study, focusing on the overall conditions of school leadership, organisation of teachers and organisational capacity.

Our finding emphasising the significance of *change pressure* in driving improvement aligns with the existing literature on accountability (Duke & Salmonowicz, 2010), affirming that accountability serves as a fundamental factor in improvement. While we did not study individual teacher accountability, but rather the accountability that stems from a school being labelled as a "poor performer", our findings indicate at least two ways in which schools were made to feel accountable. For those identified as absolute underperformers, local press coverage may be important, whereas the relatively underperforming schools might require attention from stakeholders with sufficient information to identify their poor performance. This suggests ample opportunities for research on accountability within various school-system contexts.

Research may also seek more granularity in the conditions probed in the current study – for example, whether organisational capacity is improved by utilising educational data (Herman et al., 2008), the extent to which the organisation and collaboration of teachers depend on some lower threshold of teacher turnover (Leithwood, 2007) or the extent to which school leadership should stress student pupil health and safety and discipline (Astor et al., 2010; Sprague et al., 2001). Research may also seek to compare and integrate the results from traditional least-square regression models of high-performing schools with results from QCA of the same underlying schools (Fiss et al., 2013; Rihoux, 2006).

Contributions to educational policy and practice

Showing that multiple paths to a successful turnaround are possible, and moderated by context, should encourage policymakers to move beyond "one size fits all" improvement programmes. By identifying combinations of conditions (sufficient solutions) that constitute a

bare minimum for school turnaround, we provide critical guidance to policymakers and practitioners who operate within various constraints to make trade-offs between different improvement efforts. At a general level, we provide the insight that some leadership resource (the principal's focus on core operations or the school district's quality assurance) needs to be in place, regardless of context, for most turnaround schools. This highlights that bureaucrats and managers at the school-district level should not disengage from quality assurance by outsourcing all responsibility to individual schools – particularly if the principal lacks the required competence.

Another general finding is that context is key. Conditions for school turnaround in urban schools are multiplex, which means that tailor-made solutions might be necessary for these schools. In some contexts, our results suggest that effective school leadership might not be necessary for a turnaround, specifically in schools with advantaged pupil populations in urban settings. In such cases, raising academic expectations is instrumental and can drive improvement – at a relatively low cost. More broadly, our findings suggest that prior to embarking on large-scale school improvement initiatives, it may be worthwhile to inventory and categorise the poorly performing schools so that improvement initiatives can be better targeted.

Finally, certain groups of teachers can constitute an obstacle, as they may hinder full participation in a collaborative culture among teachers across the school. In such cases, school leaders should work with the teacher group to improve the collaborative culture regardless of context. However, establishing such a collaborative culture may be easier in more stable environments, such as rural settings, where teacher turnover rates are lower. In sum, the results of this study provide ways for schools and school-district leaders to make informed choices about potential pathways for school turnaround, given the local context.

Underperforming schools that embark on the type of organisational change required to achieve a turnaround often work in stressful environments characterised by intense pressure from parents, school districts, other stakeholders and the media. Our study shows that school turnaround can and does happen without the active involvement of the school district. However, envisioning and enacting change and improvement is more challenging without active support from stakeholders outside the immediate school environment. Our study, and many others, have shown that school leadership is imperative for the effective turnaround of schools – but ideally speaking, principals should not be left to manage all on their own. Raising teachers' professional standards and capacity-building (Harris, 2011) and encouraging engagement from school stakeholders in the local community may be worthwhile practices for school leaders (Stone-Johnson, 2014).

Limitations

Our paper also comes with limitations, several of which offer avenues to explore in future research. Two methodological limitations concern the type of QCA method employed and the qualitative data used. We employ a "crisp set" QCA where schools are either "in" or "out" of a condition, which has the advantage of being relatively simple to operationalise and interpret results from. There is, however, also the option of using QCA with "fuzzy sets" – where schools are "more or less in", or "more or less out" of a causal condition for school turnaround – in essence allowing for greater nuance in operationalising the conditions. Even though our sensitivity analysis indicated that – in our setting – a change in calibration would not have yielded substantially different results, fuzzy set analysis offers a promising opportunity for future research.

Another limitation is our data. As we sampled from all the schools in Sweden, we relied on available School Inspectorate data. The School Inspectorate was established in 2008,

which makes data collection for earlier periods impossible. Although it was useful for our purposes, it is also easy to imagine using more qualitatively rich data – for instance, from a large-scale interview study – to operationalise the conditions. During the study and the interviews, we also came across suggestions that teacher turnover, (disruptive) pupil behaviour, and the experience and backgrounds of teachers and principals could potentially be important to school turnaround, but there were no reliable data sources for this information. It may also be interesting, based on the different pathways identified in our study, to carry out extensive ethnographic fieldwork in schools that fall into the different turnaround categories that we identify. For the policy-oriented, it may be of interest to study how many of the policy initiatives for turnaround are, in any way, contextually sensitive. It would also be interesting to identify in which programmes it would be feasible to aim for a pre-programme classification of schools into potential turnaround categories.

Another potential limitation of our study pertains to the temporal sequence between our identified conditions and the turnaround process. While we cannot precisely identify when the changes in conditions occur, our research design requires that the changes precede the completion of the turnaround in our longitudinal dataset. This underscores the importance of interpreting the most empirically relevant solutions, as any potential bias arising from temporal ordering is unlikely to be systematic. Future research endeavours could address these complexities by leveraging recent developments in QCA to account for temporality more effectively (Caren & Panofsky, 2005).

A central tenet of our theory is that context is pivotal in research on school turnaround (Boyne & Meier, 2009; Meyers & Smylie, 2017; Murphy & Meyers, 2007). Hence, all results from the current study are not necessarily generalisable to other school systems. Future studies in different contexts and school systems may need to explore the validity of conditions for turnaround evidenced in the current study and explore additional

conditions. Other theoretically salient conditions indicated in the literature include teachers' and principals' qualifications (Harbatkin, 2022; Henry et al., 2020) or staff turnover (Henry et al., 2020; Leithwood, 2007), which could be explored as potential conditions for school turnaround. However, staff turnover might be challenging to include as a condition, as turnover rates could be theorised as both the cause and effect of a school turnaround process. Finally, our study is based on turnaround processes spanning the years between 2008 and 2019, with turnaround noted when the school's performance rose above the median for at least two consecutive years. Further research on even more long-lasting turnaround processes, as well as research on gradual decline and potential turnaround in schools, represent important future pathways.

References

Abdulkadiroğlu, A., Pathak, P. A., Schellenberg, J., & Walters, C. R. (2020). Do parents value school effectiveness? *American Economic Review*, *110*(5), 1502-1539.

Adolfsson, C.-H., & Alvunger, D. (2017). The nested systems of local school development: Understanding improved interaction and capacities in the different sub-systems of schools. *Improving schools*, *20*(3), 195-208.

Adolfsson, C.-H., & Alvunger, D. (2020). Power dynamics and policy actions in the changing landscape of local school governance. *Nordic Journal of Studies in Educational Policy*, *6*(2), 128-142.

Ahlström, B., & Aas, M. (2020). Leadership in low-and underperforming schools—two contrasting Scandinavian cases. *International Journal of Leadership in Education*, 1-22.

Astor, R. A., Guerra, N., & Van Acker, R. (2010). How can we improve school safety research? *Educational researcher*, *39*(1), 69-78.

Bingham, A. J., Dean, S., & Castillo, J. (2019). Qualitative comparative analysis in educational policy research: Procedures, processes, and possibilities. *Methodological Innovations*, *12*(2), 2059799119840982.

Borman, G. D., & Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of educational research*, *78*(3), 367-409.

Boyne, G. A., & Meier, K. J. (2009). Environmental change, human resources and organizational turnaround. *Journal of Management Studies*, *46*(5), 835-863.

Böhlmark, A., Grönqvist, E., & Vlachos, J. (2016). The headmaster ritual: The importance of management for school outcomes. *The Scandinavian Journal of Economics*, *118*(4), 912-940.

Böhlmark, A., Holmlund, H., & Lindahl, M. (2016). Parental choice, neighbourhood segregation or cream skimming? An analysis of school segregation after a generalized choice reform. *Journal of Population Economics*, *29*(4), 1155-1190.
Capano, G., & Pritoni, A. (2020). Exploring the determinants of higher education performance in Western Europe: A qualitative comparative analysis. *Regulation & Governance*, *14*(4), 764-786.
Caren, N., & Panofsky, A. (2005). TQCA: A technique for adding temporality to qualitative comparative analysis. *Sociological methods & research*, *34*(2), 147-172.
Cilesiz, S., & Greckhamer, T. (2020). Qualitative comparative analysis in education research: its current status and future potential. *Review of Research in Education*, *44*(1), 332-369.
Cyert, R. M., & March, J. G. (1963). A behavioral theory of the firm. *Englewood Cliffs, NJ*, *2*(4), 169-187.
De la Torre, M., Allensworth, E., Jagesic, S., Sebastian, J., Salmonowicz, M., Meyers, C., & Gerdeman, R. D. (2013). *Turning around low-performing schools in Chicago*. ERIC.
Duke, D., & Salmonowicz, M. (2010). Key decisions of a first-year 'turnaround'principal. *Educational Management Administration & Leadership*, *38*(1), 33-58.
Edmark, K. (2019). Location choices of Swedish independent schools. *The Annals of Regional Science*, *63*(1), 219-239.
Edmark, K., Frölich, M., & Wondratschek, V. (2014). Sweden's school choice reform and equality of opportunity. *Labour Economics*, *30*, 129-142.
Fiss, P. C., Sharapov, D., & Cronqvist, L. (2013). Opposites attract? Opportunities and challenges for integrating large-N QCA and econometric analysis. *Political Research Quarterly*, 191-198.
Forfang, H., & Paulsen, J. M. (2021). Linking school leaders' core practices to organizational school climate and student achievements in Norwegian high-performing and low-performing rural schools. *Educational Management Administration & Leadership*, 17411432211064424.
Fullan, M. (2007). Change theory as a force for school improvement (*Intelligent leadership* (pp. 27-39). Springer.
Furnari, S., Crilly, D., Misangyi, V. F., Greckhamer, T., Fiss, P. C., & Aguilera, R. V. (2021). Capturing causal complexity: Heuristics for configurational theorizing. *Academy of Management Review*, *46*(4), 778-799.
García-Martínez, I., Montenegro-Rueda, M., Molina-Fernandez, E., & Fernández-Batanero, J. M. (2021). Mapping teacher collaboration for school success. *School Effectiveness and School Improvement*, *32*(4), 631-649.
Glaesser, J., & Cooper, B. (2012). Educational achievement in selective and comprehensive local education authorities: a configurational analysis. *British Journal of Sociology of Education*, *33*(2), 223-244.
Glick, W. H., Huber, G. P., Miller, C. C., Doty, D. H., & Sutcliffe, K. M. (1990). Studying changes in organizational design and effectiveness: Retrospective event histories and periodic assessments. *Organization Science*, *1*(3), 293-312.
Goddard, R., Goddard, Y., Sook Kim, E., & Miller, R. (2015). A theoretical and empirical analysis of the roles of instructional leadership, teacher collaboration, and collective efficacy beliefs in support of student learning. *American journal of education*, *121*(4), 501-530.
Golden, B. R. (1992). The past is the past—or is it? The use of retrospective accounts as indicators of past strategy. *Academy of Management journal*, *35*(4), 848-860.

Goldhaber, D., Strunk, K. O., Brown, N., Naito, N., & Wolff, M. (2020). Teacher staffing challenges in California: Examining the uniqueness of rural school districts. *AERA Open*, *6*(3), 2332858420951833.
Gresov, C., & Drazin, R. (1997). Equifinality: Functional equivalence in organization design. *Academy of Management Review*, *22*(2), 403-428.
Greve, H. R. (1998). Performance, aspirations, and risky organizational change. *Administrative Science Quarterly*, 58-86.
Guarino, C. M., Santibanez, L., & Daley, G. A. (2006). Teacher recruitment and retention: A review of the recent empirical literature. *Review of educational research*, *76*(2), 173-208.
Hallinger, P., & Heck, R. H. (1998). Exploring the principal's contribution to school effectiveness: 1980-1995. *School Effectiveness and School Improvement*, *9*(2), 157-191.
Hallinger, P., & Kantamara, P. (2001). Exploring the cultural context of school improvement in Thailand. *School Effectiveness and School Improvement*, *12*(4), 385-408.
Hansen, M. (2012). Key issues in empirically identifying chronically low-performing and turnaround schools. *Journal of Education for Students Placed at Risk (JESPAR)*, *17*(1-2), 55-69.
Harbatkin, E. (2022). Staffing for school turnaround in rural settings. *Leadership and Policy in Schools*, 1-23.
Harris, A. (2011). System improvement through collective capacity building. *Journal of educational administration*.
Heissel, J. A., & Ladd, H. F. (2018). School turnaround in North Carolina: A regression discontinuity analysis. *Economics of Education Review*, *62*, 302-320.
Henrekson, M., & Wennström, J. (2022). *Dumbing Down: The Crisis of Quality and Equity in a Once-Great School System—And How to Reverse the Trend*. Springer Nature.
Henry, G. T., Pham, L. D., Kho, A., & Zimmer, R. (2020). Peeking into the black box of school turnaround: A formal test of mediators and suppressors. *Educational Evaluation and Policy Analysis*, *42*(2), 232-256.
Herman, R. (2012). Scaling school turnaround. *Journal of Education for Students Placed at Risk (JESPAR)*, *17*(1-2), 25-33.
Herman, R., Dawson, P., Dee, T., Greene, J., Maynard, R., Redding, S., & Darwin, M. (2008). Turning Around Chronically Low-Performing Schools. IES Practice Guide. NCEE 2008-4020. *National Center for Education Evaluation and Regional Assistance*.
Hill, K. L., Desimone, L., Wolford, T., Reitano, A., & Porter, A. (2023). Inside school turnaround: What drives success? *Journal of Educational Change*, *24*(3), 393-423.
Hitt, D. H., & Meyers, C. V. (2018). Beyond turnaround: A synthesis of relevant frameworks for leaders of sustained improvement in previously low-performing schools. *School Leadership & Management*, *38*(1), 4-31.
Hitt, D. H., Woodruff, D., Meyers, C. V., & Zhu, G. (2018). Principal competencies that make a difference: Identifying a model for leaders of school turnaround. *Journal of School Leadership*, *28*(1), 56-81.
Holmlund, H., Sjögren, A., & Öckert, B. (2019). Jämlikhet i möjligheter och utfall i den svenska skolan. *Bilaga 7. SOU 2019: 40*.
Hopkins, D. (2003). *School improvement for real*. Routledge.
Höög, J., Johansson, O., & Olofsson, A. (2005). Successful principalship: the Swedish case. *Journal of Educational Administration*.
Jarl, M., Andersson, K., & Blossing, U. (2017). Success or failure? Presenting a case selection strategy for studies of school improvement. *Education Inquiry*, *8*(1), 17-32.

Jarl, M., Andersson, K., & Blossing, U. (2021). Organizational characteristics of successful and failing schools: A theoretical framework for explaining variation in student achievement. *School Effectiveness and School Improvement*, *32*(3), 448-464.
Jarl, M., Blossing, U., & Andersson, K. (2017). Att organisera för skolframgång: strategier för en likvärdig skola. *Natur & Kultur*.
Jas, P., & Skelcher, C. (2005). Performance decline and turnaround in public organizations: A theoretical and empirical analysis. *British Journal of Management*, *16*(3), 195-210.
Kim, J., Hargrave, E., & Brooks-Uy, V. (2018). *The Secret to Sustainable School Transformation: Slow and Steady Wins the Race*.
Larsson Taghizadeh, J. (2016). *Power from below?: The impact of protests and lobbying on school closures in sweden*, Acta Universitatis Upsaliensis].
Leat, D., Lofthouse, R., & Taverner, S. (2006). The road taken: professional pathways in innovative curriculum development. *Teachers and Teaching: theory and practice*, *12*(6), 657-674.
Leithwood, K. (2007). The emotional side of school improvement: A leadership perspective. *International handbook of school effectiveness and improvement*, 615-634.
Leithwood, K., Harris, A., & Strauss, T. (2010). *Leading school turnaround: How successful leaders transform low-performing schools*. John Wiley & Sons.
Liljenberg, M. (2022). Drivers of Improvement at Local Level–Tension and Support from Coexisting Logics. *Scandinavian Journal of Educational Research*, *66*(2), 225-237.
Liu, P. (2017). Transforming turnaround schools in China: A review. *School Effectiveness and School Improvement*, *28*(1), 74-101.
Meyers, C. (2012). The centralizing role of terminology: A consideration of achievement gap, NCLB, and school turnaround. *Peabody Journal of Education*, *87*(4), 468-484.
Meyers, C., & Smylie, M. A. (2017). Five myths of school turnaround policy and practice. *Leadership and Policy in Schools*, *16*(3), 502-523.
Murphy, J., & Meyers, C. V. (2007). *Turning around failing schools: Leadership lessons from the organizational sciences*. Corwin Press.
Murphy, J., & Meyers, C. V. (2009). Rebuilding organizational capacity in turnaround schools: Insights from the corporate, government, and non-profit sectors. *Educational Management Administration & Leadership*, *37*(1), 9-27.
Oana, I.-E., Schneider, C. Q., & Thomann, E. (2021). *Qualitative Comparative Analysis using R: A beginner's guide*. Cambridge University Press.
OECD. (2012). *PISA 2012 Results*.https://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm
OECD. (2015). *PISA 2015 Results in Focus*.https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf
Papay, J. P., Kraft, M. A., & James, J. K. (2022). Operator versus partner: A case study of blueprint school network's model for school turnaround. *Journal of Research on Educational Effectiveness*, *15*(2), 367-393.
Peck, C., & Reitzug, U. C. (2014). School turnaround fever: The paradoxes of a historical practice promoted as a new reform. *Urban Education*, *49*(1), 8-38.
Player, D., & Katz, V. (2016). Assessing school turnaround: Evidence from Ohio. *The Elementary School Journal*, *116*(4), 675-698.
Quenzel, G., & Hurrelmann, K. (2013). The growing gender gap in education. *International journal of adolescence and youth*, *18*(2), 69-84.
Ragin, C. C. (2000). *Fuzzy-set social science*. University of Chicago Press.
Ragin, C. C. (2009). *Redesigning social inquiry: Fuzzy sets and beyond*. University of Chicago Press.

Ragin, C. C. (2014). *The comparative method: Moving beyond qualitative and quantitative strategies*. Univ of California Press.

Ragin, C. C., & Fiss, P. C. (2008). Net effects analysis versus configurational analysis: An empirical demonstration. *Redesigning social inquiry: Fuzzy sets and beyond*, *240*, 190-212.

Rihoux, B. (2006). Qualitative comparative analysis (QCA) and related systematic comparative methods: Recent advances and remaining challenges for social science research. *International sociology*, *21*(5), 679-706.

Schaffer, E., Reynolds, D., & Stringfield, S. (2012). Sustaining turnaround at the school and district levels: The high reliability schools project at Sandfields Secondary School. *Journal of Education for Students Placed at Risk (JESPAR)*, *17*(1-2), 108-127.

Schneider, C. Q., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. Cambridge University Press.

Sebastian, J., Allensworth, E., & Stevens, D. (2014). The influence of school leadership on classroom participation: examining configurations of organizational supports. *Teachers College Record*, *116*(8), 1-36.

Skedsmo, G., & Huber, S. (2021). The German Context: School Turnaround in Ten Schools in Difficult Circumstances: The Need for Adaptive and Contextualized Approaches to Development and Change. *Lynnette A. Brunderman Editors*, 159.

Sprague, J., Walker, H., Golly, A., White, K., Myers, D. R., & Shannon, T. (2001). Translating research into effective practice: The effects of a universal staff and student intervention on indicators of discipline and school safety. *Education and Treatment of Children*, 495-511.

Stone-Johnson, C. (2014). Responsible leadership. *Educational Administration Quarterly*, *50*(4), 645-674.

Sun, H., Creemers, B. P., & De Jong, R. (2007). Contextual factors and effective school improvement. *School Effectiveness and School Improvement*, *18*(1), 93-122.

Swedish Association of Local Authorities and Regions. (2021). *Kommungruppsindelningen*.https://skr.se/skr/tjanster/kommunerochregioner/faktakommunerochregioner/kommungruppsindelning.2051.html

Swedish National Agency for Education. (2020). *Statistik*.Swedish National Agency for Education. https://www.skolverket.se/skolutveckling/statistik/sok-statistik-om-forskola-skola-och-vuxenutbildning?sok=SokA

Swedish National Agency for Education. (2022). *SALSA - en statistik modell*.Swedish National Agency for Education. https://www.skolverket.se/skolutveckling/statistik/salsa-statistisk-modell

Swedish School Inspectorate. (2020). *Statistik från Skolenkäten*.https://www.skolinspektionen.se/beslut-rapporter-statistik/statistik/statistik-fran-skolenkaten/

Swedish School Inspectorate. (2020). *Statstik från regelbunden tillsyn*.https://www.skolinspektionen.se/beslut-rapporter-statistik/statistik/statistik-om-regelbunden-tillsyn/

Swedish School Inspectorate. (2021). Långvarigt låga kunskapsresultat [Long-term low pupil achievment]. *Swedish School Inspectorate Tematisk kvalitetsgranskning 2021, Dnr 40-2020:2189*

Tao, Y. (2022). School turnaround through network governance: the role of turnaround schools in China's Shanghai City. *School Effectiveness and School Improvement*, *33*(1), 86-103.

The Local. (2021). Here are the best and worst schools in Sweden. *The Local, https://www.thelocal.se/20160913/here-are-the-best-and-worst-schools-in-sweden/*.

Thomann, E. (2020). Qualitative Comparative Analysis for comparative policy analysis (*Handbook of research methods and applications in comparative policy analysis* (pp. 254-276). Edward Elgar Publishing.

van Der Steen, M., van Twist, M., Fenger, M., & Cointre, S. L. (2013). Complex causality in improving underperforming schools: A complex adaptive systems approach. *Policy & Politics*, *41*(4), 551-567.

Yu, Z., & Jiang, X. (2022). How School Climate Affects Student Performance: A Fuzzy Set Qualitative Comparative Analysis Based on the Perspective of Education System. *Mathematical Problems in Engineering*, *2022*.

Appendix 1: Descriptive statistics for turnaround and non-turnaround schools

Table A1.1: Descriptives of Conditions for Turnaround Schools

	N	Mean	Std.
Teacher Collaboration	42	0.333	0.471
Principals Focus on Core Operations	42	0.571	0.495
High Academic Expectations	42	0.310	0.462
School District Quality Assurance	42	0.667	0.471
Urban	42	0.405	0.491
Change Pressure	42	0.619	0.486

Table A1.2: Descriptives of Conditions for Non-Turnaround Schools

	N	Mean	Std.
Teacher Collaboration	35	0.229	0.420
Principals Focus on Core Operations	35	0.457	0.498
High Academic Expectations	35	0.286	0.452
School Districts Quality Assurance	35	0.457	0.498
Urban	35	0.686	0.464
Change Pressure	35	0.657	0.475

Appendix 2: Descriptive statistics for samples and subsamples

Table A2.1: Descriptives of the full sample

	N	Mean	St. dev
Turnaround	77	0.545	0.501
Teacher Collaboration	77	0.286	0.455
Principals Focus on Core Operations	77	0.519	0.503
High Academic Expectations	77	0.299	0.461
School District Quality Assurance	77	0.571	0.498
Urban	77	0.532	0.502
Change Pressure	77	0.636	0.484

TableA2.2: Descriptives of the urban sub-sample

	N	Mean	St. Dev.
Turnaround	41	0.415	0.499
Teacher Collaboration	41	0.220	0.419
Principal Focus on Core Operations	41	0.537	0.505
High Academic Expectations	41	0.341	0.480
School District Quality Assurance	41	0.683	0.471
Change Pressure	41	0.488	0.506

Table A2.3: Descriptives of the non-urban subsample

	N	Mean	St. Dev.
Turnaround	36	0.694	0.467
Teacher Collaboration	36	0.361	0.487
Principal Focus on Core Operations	36	0.500	0.507
High Academic Expectations	36	0.250	0.439
School District Quality Assurance	36	0.444	0.504
Change Pressure	36	0.806	0.401

Appendix 3: Necessity analysis

The necessity analysis consists of examining both single necessary conditions as well as SUIN conditions. SUIN refers to a *Sufficient* but *Unnecessary* step of a combination that is *Insufficient* but *Necessary* for the outcome to occur. Necessity and SUIN conditions are analysed through *coverage, consistency* and *empirical relevance*. *Empirical relevance* is measured as *relevance of necessity* (RoN). This determines the trivialness of the necessity relation, i.e., the cases in the relation (condition X) are much more frequent than the negation of the condition (~X) or when the condition (X) is much more frequent than the outcome (Y).

As per the rules-of-thumb of Oana et al. (2021), consistency should be over 0.9, and coverage and RoN should be relatively high (>0.6) for a condition or a combination of conditions to be considered to be necessary. For Analytical Steps 1, 2, 3 and 5, no conditions or combinations of conditions could be considered necessary[20]. For analytical step 4 (non-urban school turnarounds), we find multiple SUIN conditions in two solutions that are empirically relevant: The combination of the absence of *Change Pressure* or the presence of *Principals Focus on Core Operations,* or the presence of *School District Quality Assurance* appear necessary for a turnaround. The same goes for a second combination: the absence of *Change Pressure,* the presence of *Principal's Focus on Core Operations,* or the presence of *High Academic Expectations.* However, these solutions are contradicted by two schools in our sample that turn around without fulfilling any of these conditions. Whether this contradiction is relevant enough to falsify the necessity claims is unclear. Two out of 25 turnaround schools in this subsample constitute an 8% deviance from the necessity claims. When examining the individual histories of the deviating schools as reported in media and the Swedish School Inspectorate reports, we found no substantial explanation for why they managed to turn around their poor performance. Based on this, it is difficult to conclude that they constitute exceptional cases that do not falsify the necessity claims. As a precaution, we treat these as standard cases and conclude that no necessary combination of conditions exists.

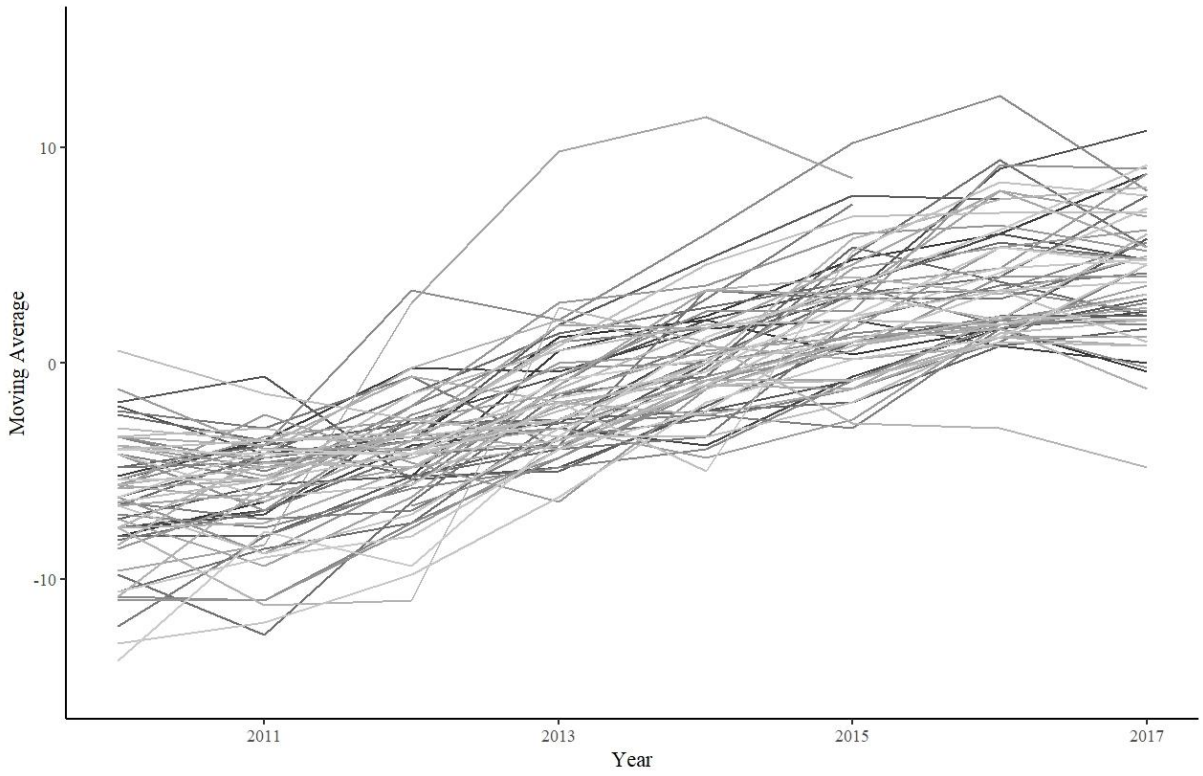
In sum, none of the proposed conditions is necessary for school turnaround, either in combination or alone. This means that none of these conditions is so foundational that a school cannot turn around without it, as we have identified a few cases of turnaround that have no combination of these conditions fulfilled.

[20] Results can be provided upon request.

Appendix 4: Truth table for analytical step 2

Change Pressure	Teacher	Principal	HighAE	SDQA	Outcome	N	Inclusion score
0	0	0	1	1	1	3	1.000
0	0	1	0	1	1	3	1.000
1	0	0	1	1	1	3	1.000
0	0	0	1	0	1	1	1.000
0	1	0	0	1	1	1	1.000
1	0	1	1	0	1	1	1.000
1	1	0	1	1	1	1	1.000
1	1	1	1	1	1	1	1.000
1	1	1	0	0	1	6	0.833
1	1	1	0	1	1	5	0.800
1	0	1	0	1	C	6	0.667
1	0	0	0	1	C	3	0.667
0	0	0	0	0	0	4	0.500
1	0	1	0	0	0	4	0.500
0	0	1	0	0	0	2	0.500
0	0	1	1	1	0	2	0.500
0	1	1	1	1	0	2	0.500
0	0	0	0	1	0	8	0.375
1	1	0	0	0	0	3	0.333
1	0	1	1	1	0	5	0.200
1	0	0	0	0	0	8	0.125
1	0	0	1	0	0	2	0.000
0	1	1	0	1	0	1	0.000
0	1	1	1	0	0	1	0.000
1	1	1	1	0	0	1	0.000
0	0	1	1	0	?	0	-
0	1	0	0	0	?	0	-
0	1	0	1	0	?	0	-
0	1	0	1	1	?	0	-
0	1	1	0	0	?	0	-
1	1	0	0	1	?	0	-
1	1	0	1	0	?	0	-

Appendix 5: Performance trajectory of turnaround schools in the sample.



Note: The figure depicts the performance trajectory of the total number of turnaround schools (*n=62*), before exclusion of cases due to missing data or exceptional circumstances.

Appendix 6: Do changes in frequency and consistency thresholds affect the QCA results?

This appendix analyses the robustness of our main findings as outlined in Analytical Step 2, given that we change the frequency and consistency thresholds as the general recommendation implies (Oana et al., 2021; Schneider & Wagemann, 2012). The results of these analyses are found in Table A9 below. The frequency cutoff denotes how many cases must be in a truth table row for it to be used in the minimisation process. In general, we have no limitation but raise it to the threshold of 2 and 3 cases for the robustness analysis. The consistency cutoff is the minimum consistency score a truth table row can have to be used as a combination leading to the outcome in the minimisation process, and we set ours to 0,8 as default as per recommendation by Schneider and Wagemann (2012) and Greckhamer et al. (2013). For the robustness tests, we raise it above 0,81 and 0,84 as the only two levels where truth table rows are discarded are between 0,8 and 1. Columns 1-3 include information regarding which cutoffs we are altering in the robustness analysis and by how much. Columns 4-6 indicate how each scenario's three main solutions change. Column 7 shows how the solution coverage changes in each scenario.

Table A6: How changes in frequency and consistency threshold affect solutions

Change	**Frequency Cutoff**	**Consistency Cutoff**	**"Bottom-up" Solution**	**"Bypass" Solution**	**"Leeway" Solution**	**Solution coverage**
Original model	*1*	*0,8*	*Change Pressure* Teacher*Principal* ~HighAE*	*~Principal* HighAE*SDQA*	*~Change Pressure* ~Teacher*Principal *~HighAE*SDQA*	*0,548*
Frequency	2	0,8	Change Pressure* Teacher*Principal	Same as original	Same as original	0,476
Frequency	3	0,8	Change Pressure* Teacher*Principal (small)*SDQA	~Principal* HighAE*SDQA (small)	-	0,31
Consistency	1	0,81-0,83	Change Pressure(small)*Teacher*Principal*~HighAE*~SDQA	Same as original	Same as original	0,45
Consistency	1	0,84-	Change Pressure*Teacher *HighAE*SDQA	Same as original	Same as original	0,33

Appendix 7: Does changing the calibration of conditions affect the QCA results?

This appendix section entails an analysis of the robustness of our main findings as outlined in Analytical Step 2, given that we change the calibration of some of the conditions as recommended by (Oana et al., 2021; Schneider & Wagemann, 2012). The conditions we change the calibration for are *Teacher Collaboration*, *Principal's Focus on Core Operations*, *High Academic Expectations* and *Change Pressure. School District Quality Assurance* is not included due to a lack of calibration options (the data is a dichotomous variable). Table A7 below shows the results of the analysis. The first row includes information regarding Analytical Step 2 when there is no change in calibration. The rest of the rows entail scenarios where the calibrations are changed to a more restrictive and a more inclusive, respectively. Columns 1-3 include information regarding which condition is the focal condition for each scenario and how the calibration is changed. Column 4 shows how many cases are included in each scenario's focal condition. Columns 5-7 indicate how each scenario's three main solutions are changing. Column 8 includes how the solution coverage changes in each scenario. The calibration levels are chosen considering two factors for the robustness analysis of the conditions collected from the Swedish School Inspectorate (2020a). The first factor is simply changing the calibration levels for the *state* condition from the score in-between "Fully Agree" and "Partially Agree" (8.355) to a score in-between the old *state* cutoff and the "Fully Agree" or "Partially Agree" that is either (9.17) or (7.51). The second factor is if there still is a balance across the membership in the conditions, i.e., preferably no more than 80 per cent or less than 20 per cent membership in the condition. If this is the case, the calibration is changed to a point in-between the old cutoff (8.355) and the new "in-between" cutoff (9.17 or 7.51), so we are left with either (8.75 or 7.92). This is repeated until a challenging but not empirically implausible cutoff is found. The new levels for the *change* condition are chosen as an increase or decrease by 50 per cent to (0.999 or 0.333) from 0.666. If empirically implausible, the calibration is changed to follow the *state* cutoff symmetrically, i.e., to in-between cutoffs of (0.8 and 0.5). For the condition *Change Pressure*, we raise and lower the cutoff from 90 to 95 or 85 based on the idea that we deem these plausible ranges with symbolic cutoffs (a failure rate of 5 or 15 per cent bears more meaning than a failure rate of 7 or 13 per cent).

Table A7: How changes in calibration of conditions affect turnaround solutions

Condition varied	State cutoff	Change cutoff	Inclusion in varied condition	"Bottom-up" solution	"Bypass" solution	"Leeway" solution	Solution coverage
Original model	*8.355 (for Teacher, Principal, HighAE)* *90 per cent (for Change Pressure)*	*0.666 (for Teacher, Principal, HighAE)*	*Teacher=0.286* *Principal=0.519* *HighAE=0.299* *Change Pressure = 0.636*	*Change Pressure* Teacher*Principal*~HighAE*	*~Principal*HighAE*SDQA*	*~Change Pressure*~Teacher* Principal*~HighAE*SDQA*	*0.548*
Teacher	8.751	0.8	0.234	Change Pressure(small)* Teacher*Principal*~HighAE* ~SDQA	Same as original	Same as original	0.405
Teacher	7.918	0.5	0.351	Change Pressure(small)* Teacher*Principal*~HighAE* ~SDQA	Same as original	~Teacher*Principal*~HighAE* SDQA	0.571
Principal	8.751	0.8	0.416	Same as original	Change Pressure*Teacher* HighAE(small)*SDQA	~Change Pressure*~Teacher* Principal*~HighAE	0.452
Principal	7.918	0.5	0.714	Change Pressure*Teacher* SDQA	~Change Pressure*~Principal *HighAE	-	0.310
HighAE	8.55	0.733	0.182	Change Pressure*Teacher* Principal(small)*SDQA	Same as original	~Change Pressure*~Teacher* Principal *SDQA	0.381
HighAE	7.918	0.5	0.636	Change Pressure(small)* Teacher*~HighAE*~SDQA	Same as original	~Change Pressure*Principal* ~HighAE	0.476
Change Pressure	95	-	0.883	Same as original	Change Pressure(small)* ~Principal*HighAE*SDQA	Same as original (although only one case)	0.452
Change Pressure	85	-	0.429	Change Pressure*Teacher* Principal*~HighAE*~SDQA	Change Pressure*Teacher* HighAE*SDQA	Same as original	0.548

Appendix 8: Does random corruption and deletion of cases affect the QCA results?

In QCA, it is helpful to probe how robust results are to the "corruption" and deletion of cases (Duşa, 2018). *Corruption of cases* is simulation changes in various values in the conditions (from 0 to 1 or from 1 to 0), which might cause reallocation of cases within the different truth table rows. *Deletion of cases* means removing cases from the truth table. *Independent or dependent perturbation assumptions* concern whether the deletion and corruption should happen independently from each other or if they should be tied to a fixed number of cases. Rows in each table indicate the probability of perturbation (only applicable under the independent perturbation assumption), and columns indicate the number of perturbations (only applicable under the dependent perturbation assumption). The numbers in the cells indicate the probability of retention (i.e., the probability of the solutions in the "models" remaining the same as in the baseline model). The corruption and deletion robustness test results are presented in four tables below. The tables are split on robustness logic of corruption (Table A8.1 & Table A8.2) and deletion (Table A8.3 & Table A8.4) but also independent (Table A8.1 & Table A8.3) and dependent (Table A8.2 & Table A8.4) perturbation assumptions.

Table A8.1: Independent Perturbation Assumption (IPA)-Corruption of Cases

	N=1	N=2	N=3
P=0.025	0.4498788	-	-
P=0.05	0.2028384	-	-
P=0.075	0.09159842		

Table A8.2: Dependent Perturbation Assumption (DPA)-Corruption of Cases

	N=1	N=2	N=3
P=0.025	0.5844156	0.3444976	0.2047027
P=0.05	-	-	-
P=0.075	-	-	-

Table A8.3: Independent Perturbation Assumption (IPA)-Deletion of Cases

	N=1	N=2	N=3
P=0.025	0.6335018	-	-
P=0.05	0.3966463	-	-
P=0.075	0.2457953	-	-

Table A8.4: Dependent Perturbation Assumption (DPA) -Deletion of Cases

	N=1	N=2	N=3
P=0.025	0.8831169	0.7751196	0.6763226
P=0.05	-	-	-
P=0.075	-	-	-

Appendix 9: What is the effect of changing the sampling thresholds?

In this appendix, we vary the initial thresholds we choose to define turnaround and non-turnaround schools. The lower threshold to define the school's period of low performance is at the lowest quartile (percentile 0.25) at the adjusted performance of -3.2. The threshold to define some schools as turnaround (i.e., performing above this threshold at a later period) is at the median (percentile 0.5) at the adjusted performance of 0.6. The thresholds allow for a generous definition of school turnaround, as approximately 17 per cent of schools that qualify for being low performers manage to reach the turnaround threshold. Thus, in this appendix, we apply stricter definitions of both the definition of low-performing school and the definition of turnaround school, as shown in Table A10 below. The low-performance threshold is varied from the 25th percentile to the 22.5th percentile and 20th percentile while the turnaround threshold is varied from the 50th percentile to the 52.5th and 55th percentile. The increased strictness of these definitions changes the ratio of turnarounds in the low-performance category from 17 per cent to approximately 10 per cent.

Table A9: How altering sampling thresholds change the analysis.

Change	**N**	**"Low performance" threshold percentile**	**"Turnaround performance" threshold percentile**	**"Bottom-up" solution**	**"Bypass" solution**	**"Leeway" solution**	**Solution coverage**
Original model	*77*	*0.25 (adjusted performance: -3.2)*	*0.5 (adjusted performance: 0.6)*	*Change Pressure *Teacher*Principal *~HighAE*	*~Principal* HighAE*SDQA*	*~Change Pressure *~Teacher* Principal *~HighAE *SDQA*	*0.548*
Low-performance threshold	*64*	*0.225 (adjusted performance: -3.6)*	*0.5 (adjusted performance: 0.6)*	*Change Pressure (small)*Teacher* Principal*~HighAE *~SDQA*	*Same as original*	*~Change Pressure *Principal *~HighAE*	*0.424*
Low-performance threshold	*47*	*0.2 (adjusted performance: -4.2)*	*0.5 (adjusted performance: 0.6)*	-	*Same as original*	*~Change Pressure *Principal *~HighAE*	*0.261*
Turnaround performance threshold	*72*	*0.25 (adjusted performance: -3.2)*	*0.525 (adjusted performance: 1)*	*Same as original*	*Same as original*	*Same as original*	*0.541*
Turnaround performance threshold	*69*	*0.25 (adjusted performance: -3.2)*	*0.55 (adjusted performance: 1.2)*	*Same as original*	*Same as original*	*Same as original*	*0.588*

Appendix 10: What is the effect of dropping *state* or *change* as part of the calibration?

In this appendix, we have assessed the relative contribution of *change* vs *state* when operationalising the school-level conditions (*Teacher Collaboration*, *Principal's Focus on Core Operations* and *High Academic Expectations*). The question we address here is how sensitive our results are to whether we calibrate our conditions as *state* only (i.e., having reached a particular level) or *change* only (i.e., having changed significantly over the study period). In Table A10, column 1 includes information regarding which part of the calibration is dropped and for which condition. Column 2 shows how many cases are included in each scenario's focal condition. Columns 3-5 indicate how each scenario's three main solutions change. Column 6 shows how the solution coverage changes in each scenario.

Table A10: How dropping and adding *change* and *state* calibration affect solutions

Part of the calibration dropped	**Inclusion in focal condition**	**"Bottom-up" solution**	**"Bypass" solution**	**"Leeway" solution**	**Solution coverage**
Original model	*Teacher=0,286* *Principal=0,519* *HighAE=0,299*	*Change Pressure* Teacher*Principal* ~HighAE*	*~Principal*HighAE* SDQA*	*~Change Pressure* ~Teacher*Principal* ~HighAE*SDQA*	*0,548*
No Teacher *Change*	0,013	-	Same as Original	-	0,19
No Teacher *State*	0,273	Same as Original	Same as Original	Same as Original	0,548
No Principal *Change*	0,182	Change Pressure* Principal*~HighAE	Change Pressure* Teacher*~Principal (small)*HighAE* SDQA	(several possible solutions)	0,33
No Principal *State*	0,364	Change Pressure (small)*Teacher* Principal*~HighAE *~SDQA	Change Pressure* Teacher*HighAE* SDQA	~Change Pressure* ~Teacher*Principal* ~HighAE	0,405
No HighAE *Change*	0,156	Same as Original	Change Pressure* ~Principal*SDQA	Same as Original	0,524
No HighAE *State*	0,169	Change Pressure* Teacher*Principal (small)*SDQA	Same as Original	Same as Original	0,381

The first insight is that calibrating *Teacher Collaboration* and *Principal's Focus on Core Operations* to include *change* is core to our findings. Without such a calibration of the

conditions, the solution coverage drops below 0.35, and the *bottom-up turnaround* solution disappears from its prior form. A second insight is that *state* operationalisation is less critical but far from negligible. Dropping the *state* calibration of *Principal's Focus on Core Operations* or *High Academic Expectations,* the solution coverage drops to approximately 0.4, which stresses the importance of accounting for both mechanisms. Even though an organisational *change* primarily drives school turnaround, it is important to account for the existing resources (*state*) that might be a recipe for success in conjunction with other factors (change or state).

Appendix 11: Table of empirical findings from interviews

School	A	B	C	D	E	F	G
Main problems expressed by principal	Low pupil SES	Low pupil SES	Low pupil SES	Low pupil SES-->gradually changing	Change pressure, Noted in the government school improvement program	Low teacher expectations of pupils	Low expectations
	Violence/ unrest	Violence/unrest	Turnover of principals	School competition between public and independent school	Low SES	Resistance among groups of teachers	Leadership (prior principal created a fearful culture)
		Work environment	Poor teacher culture	Heterogeneity in pupil intake and overall context		Unrest	Individualistic teacher culture
				Principal turnover		Low SES	
				Teacher disagreement			
				Difficult parents			
Urban / Rural	Urban	Urban	Urban	Urban	Urban	Rural	Rural
Turnaround	YES	YES	NO	NO	YES	YES	YES
Conditions							
Principal Focus on Core Operations	YES	YES	NO	YES	NO	YES	NO
High Academic Expectations	YES	NO	NO	YES	NO	NO	NO
Teacher Collaboration	YES	YES	NO	NO	NO	NO	NO
School District Quality Assurance	YES	YES	NO	YES [reorganis-ation]	NO	NO	NO
Strategy for turnaround expressed by principal	Financial turnaround	Active leadership group	Generate predictability and stability by staying on as principal		Government school improvement program	Cultural change	Cultural change (from an individualistic teacher culture and a controlling principal to a more relaxed culture among teachers and between teachers and the principal)
	Enhancing safety	Dual-teacher system	Improving work culture among teachers	Avoid "losing" students to other schools	School District Support	Raising expectations	
	Raising expectations ("finding something good in each pupil & leverage")				Change in SES composition of pupils	Counter disorder, report to the police	Raising expectations
	"Home" classrooms				Sports' focus	Principal focusing on the core parts of the job	
	Recruiting and educating teachers				"Home" classrooms		
					Merger into joint school for grades F-9		
					Dual-teacher system		

Notes: Main problems denote the most concerning problems occurring at the school during our study period, as reported by the principal. *Strategy for turnaround* denotes the overall strategy taken during the study period, such as focusing first and foremost on the school's financial problems (financial turnaround), reorganising the leadership group, or initiating a cultural change among teachers.

Appendix 12: Minimisation algorithm

The minimisation of the truth table (a way of organising Boolean logical statements, see Appendix 6) into a more redundant form utilises the Quince-McCluskey algorithm. In the first step, this algorithm groups the rows based on the number of conditions (columns in the truth table) present. In the following steps, it compares the solutions within the group if they are similar in all conditions but one, which it then reduces into an "irrelevant" condition. The algorithm then iterates this step to further parsimony. This process results in a prime implicant chart showing which of the reduced expressions cover what original expressions. If any reduced expression is fully covered by other reduced expressions, this can also be eliminated to achieve further parsimony. Sometimes, the prime implicant chart requires the researcher to decide which primitive expression to include in the analysis. We have always tried to be theoretically guided when confronted with such a decision.