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Teachers' mindset and stress: Implications for student
performance

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Abstract

The current study investigated the interplay between teachers' psychological constructs—specifically stress and mindset—and their influence on student academic performance over time. Three hypotheses were outlined and tested using linear mixed effects statistical models. Data collection instruments included self-report tools, such as standardized teacher stress evaluation tool and a non-standardized mindset test, as well as two custom-made tests for measuring student performance over a two-month period.

The results refuted the first hypothesis pertaining to the relationship between teacher stress and mindset and provided evidence for a positive correlation between the two variables, suggesting that growth-mindset-oriented teachers tend to experience higher stress levels. Analyses related to the second hypothesis yielded mixed results. The interaction model revealed significant relationship between teacher stress and student performance over time. However, stress as main effect remained a non-significant predictor, rejecting the existing theories of stress contagion in the classroom. Moreover, teachers' mindset was found to have a positive but non-significant association with students' learning outcomes. Complementary analyses revealed that including the individual teachers as fixed effects provided the greatest predictive power among all models, indicating that individual teacher-related characteristics beyond mindset and stress provide the most reliable means for predicting student performance.

Despite the study's limitations—including small samples sizes and reliance on self-report instruments—the results highlight the multifaceted, interconnected nature of the educational environment as well as the need for more complex, mixed-method approaches to evaluate the interplay between teachers' psychological factors, such as stress and mindset, and their influence on student performance over time.

Kurze Zusammenfassung

Die vorliegende Studie untersucht das Zusammenspiel psychologischer Faktoren der Lehrkräfte—insbesondere Stress und Mindset—und deren Einfluss auf die akademischen Leistungen von Schüler*innen über die Zeit. Die drei Hypothesen wurden mithilfe von linearen Mixed-Effekts-Modellen getestet. Die Datenerhebung wurde durch Selbstberichtsinstrumente wie ein standardisierter Stressfragebogen und ein nicht-standardisierter Mindsetfragebogen sowie zwei eigens entwickelte Tests zur Ermessung der Schülerleistungen über einen Zeitraum von zwei Monaten durchgeführt.

Die Ergebnisse widerlegten die erste Hypothese über die Assoziation zwischen Lehrerstress und Mindset und zeigten eine positive Korrelation zwischen den beiden Variable, was darauf hinweist, dass Lehrerinnen, die einen Growth-Mindset haben, tendenziell höhere Stresslevels erleben. Die Analysen zur zweiten Hypothese ergaben gemischte Ergebnisse. Das Interaktionsmodell zeigte einen signifikanten Zusammenhang zwischen dem Stress der Lehrkräfte und akademischer Leistungen der Schüler*innen über die Zeit. Allerdings blieb Lehrerstress als Haupteffekt ein nicht signifikanter Prädiktor, wodurch die vorliegenden Theorien über emotionale Ansteckung im Klassenzimmer nicht bestätigt wurden. Darüber hinaus zeigte Lehrermindset eine positive, jedoch nicht signifikante Assoziation mit Schülerleistungen. Ergänzende Analysen haben hervorgehoben, dass die Berücksichtigung der individuellen Lehrkräfte als *fixed effects* die größte Vorhersagekraft unter allen Modellen bietet, was darauf hindeutet, dass lehrkraftspezifische Eigenschaften, die über Mindset und Stress hinausgehen, die zuverlässigsten Faktoren für die Vorhersage der Schülerleistungen darstellen.

Trotz der Einschränkungen der Studie—darunter kleine Stichprobengröße und die Abhängigkeit von Selbstberichtsinstrumenten—verdeutlichen die Ergebnisse der komplexe und gegenseitig verbundene Charakter der Bildungsumgebung und unterstreichen die Notwendigkeit von Mixed-Methods-Ansätzen zur Untersuchung des Zusammenspiels von psychologischen Faktoren wie Stress und Mindset und deren Einfluss auf die akademischen Leistungen der Schüler*innen über die Zeit.

Table of contents

List of figures	5
List of tables	6
1. Introduction.....	7
1.1. Mindset theory	9
1.1.1. What is a mindset?.....	9
1.1.2. Where do mindsets come from?	11
1.1.3. Mindsets and academic achievement	14
1.1.4. Critical voices on mindset theory.....	18
1.2. (Teacher) Stress	20
1.2.1. Definition	20
1.2.2. Stressors in the classroom	22
1.2.3. Is foreign language teaching even more stressful?	23
1.2.4. Implications of teacher stress.....	24
1.2.5. Growth mindset interventions: The solution to this crisis?	26
1.3. Rationale and hypotheses.....	27
1.3.1. Rationale.....	27
1.3.2. Hypotheses	28
2. Methodology	31
2.1. Research design	31
2.2. Participants	32
2.3. Data collection methods and materials	34
2.4. Data analysis.....	37
3. Descriptive statistics.....	39
3.1. Teachers' stress levels.....	39
3.2. Teachers' mindset scores	40
3.3. Student performance.....	41
4. Inferential statistics	44
4.1. Hypothesis 1: Teachers' mindset and stress.....	44
4.2. Preliminary analysis: ICCs	45
4.3. Hypothesis 2: Teachers' stress and student performance.....	46
4.4. Hypothesis 3: Teachers' mindset and student performance	47
4.5. Complementary analysis: The teacher factor	48
5. Discussion	54
5.1. Stressed yet growth-mindset-oriented	55

5.1.1.	A closer look: Interpreting mindset scores	56
5.1.2.	A closer look: Examining teachers' stress scores.....	58
5.1.3.	Connecting the dots: Teachers' stress and mindset	60
5.2.	Frazzled teachers, functioning students.....	63
5.3.	Teachers' mindset: Not quite significant, but not irrelevant either	68
5.4.	The teacher factor	72
5.5.	Limitations and directions for future research.....	75
6.	Conclusion	77
7.	Bibliography	80
8.	Appendix 1: Teacher data collection instruments	100
9.	Appendix 2: October testing session materials	104
10.	Appendix 3: December testing session materials.....	110

List of figures

Figure 1. Number of student per teacher who took part in the testing sessions.	36
Figure 2. Overview of teachers' stress scores.	39
Figure 3. Overview of teachers' mindset scores.	40
Figure 4. Overview of the average test scores (as percentages) from the October and December testing sessions, grouped by teacher.....	41
Figure 5. Trendline illustrating the relationship between teachers' mindset and stress scores.....	45
Figure 6. Overview of individual teachers' scores (%) on growth- and fixed-mindset questionnaire items.	56
Figure 7. Variation in total stress scores and distribution of stress-related aspects among the five participating teachers.....	58

List of tables

Table 1. Selected classes per teacher and their grade-level distribution in the testing sessions.....	33
Table 2. Overview of basic descriptive measures of students' tests scores grouped by teacher.	42
Table 3. Summary of Shapiro–Wilk tests for normality and Spearman correlation results for teachers' mindset and stress.	44
Table 4. Intraclass Correlation Coefficients (ICCs) for teachers, students, and time.	45
Table 5. Results of linear mixed effects model predicting student performance from teachers' stress levels across time.	46
Table 6. Results of linear mixed effects model evaluating the interaction effects between time and teachers' stress on student performance.	46
Table 7. Results of linear mixed effects model predicting student performance from teachers' mindset scores across time.....	47
Table 8. Results of linear mixed effects model evaluating the interaction effects between time and teachers' mindset on student performance.	48
Table 9. Results of the linear mixed-effects model including fixed effects for test time and teacher, their interaction, and random intercepts for students.	49
Table 10. Results of pairwise comparisons of estimated marginal means between teachers within each time point (October and December), based on the linear mixed-effects model.	50
Table 11. Results of model comparison using Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC).	52
Table 12. Overview of the foreign language instruction hours in Bulgarian schools by grade level.	64

1. Introduction

The impact of teachers on students' academic outcomes has been the focus of extensive research. Some of the most prominent frameworks include Bandura's self-efficacy theory (1977), Pygmalion effect (Rosenthal & Jacobson 1968), positive psychology (Seligman & Csikszentmihalyi 2000), and the Ericsson expertise theory on deliberate practice (Ericsson, Krampe & Tesch-Römer 1993). A common thread across these theories is the central role of belief—either in oneself (e.g. self-efficacy) or in others (e.g. Pygmalion effect). This shared perspective implies that performance limitations are often shaped by our perceptions rather than our inherent abilities. This observation in turn hints at the potentially transformative power of mindset and expectations.

To test this, the aforementioned theoretical frameworks have been widely applied to the educational context and in turn have provided valuable insights into the mechanisms underlying student motivation, learning, and academic achievement. Despite their invaluable contributions to educational and psychological research, they also demonstrate a broader reality of mind and behavior studies—that conceptual frameworks are rarely universally applicable or definitive. Instead, such theoretical frameworks offer new perspectives to interpret complex, context-dependent phenomena. Furthermore, such theories often provide efficient, scalable means to improve students' academic outcomes and teachers' well-being and efficacy (Rubie-Davies 2007, Yeager & Walton 2011, Roeser, Skinner, Beers & Jennings 2023).

In the light of ongoing teacher stress crisis and constant decline in student academic outcomes (Jögi, Pakarinen & Lerkkanen 2023, Wong, Ruble, Yu & McGrew 2017), it is of paramount importance to continue exploring alternative psychological frameworks. Originally developed by Carol Dweck (Dweck & Leggett 1988, Dweck 2006), the mindset theory has been continuously praised for its effectiveness, especially in educational settings.

However, its foundational ideas—namely, that animals and people develop their worldview through their own experiences—has deeper roots in psychology. Although these views were largely overshadowed during the era of behaviorism, they quietly persisted until they were brought to the forefront in the late 1960s (Dweck & Yeager 2019: 482). This marked a pivotal shift in psychology—the Cognitive Revolution. Seligman and Maier (1967) were among the pioneers on learned helplessness in animals. Their work established the notion that animals

form their beliefs about their environment through their experiences, which in turn determine their motivation (Seligman & Maier 1967). The attribution theory in humans is another cornerstone in cognition research (Weiner & Kukla 1970), foregrounding the idea that people seek explanations for their experiences, which then determine their reactions. Testing these theories in classroom environment confirmed that children of equal abilities perform differently due to their response to failure or setbacks (Dweck & Repucci 1973, Dweck 1975, Diener & Dweck 1978). Two patterns of cognition-affect behavior were identified—the maladaptive helpless and the adaptive mastery-oriented response to challenges (Dweck & Leggett 1988). In addition, the findings showcased that when faced with challenging tasks, some children despaired, whereas others enthusiastically embraced the challenge (Dweck & Repucci 1973, Dweck 1975, Diener & Dweck 1978). Further research was conducted to provide additional explanations for these results. In the 1980s the achievement goal theory emerged (Nicholls 1984, Elliot & Dweck 1988), proposing that one’s reaction to challenges can be determined by their goals. The theory distinguishes between performance goals, which aim to validate one’s abilities, and learning goals, which intend to improve one’s competences (Nicholls 1984, Elliot & Dweck 1988). However, the achievement goal theory failed to answer a major question: When possessing similar abilities, why do some care so much about validating their abilities while others are eager to learn and improve?

The pursuit of the answer to this question led to the creation of the mindset theory (Dweck 2006, Blackwell, Trzesniewski & Dweck 2007, Dweck & Yeager 2019).

Bandura’s work (1983) drew attention to the notion of self-efficacy beliefs, arguing that one’s beliefs about their capacity to achieve specific goals determine not only how people think and feel, but also what motivates them. Dweck build upon this foundation, coining the term “implicit theories of intelligence”—the unconscious beliefs people hold about their abilities as being fixed or malleable (Dweck & Yeager 2019). However, while Bandura (1983) focused solely on self-concepts about ability, Dweck extended the discussion to the implications of these beliefs about one’s intelligence and talent.

Clearly, honing these notions and ideas and creating a comprehensible framework took years of research (and is happening as we speak!), but the theory of mindsets that exists today is a valuable tool for further researching the psychology of people’s attitudes towards challenges and resilience (Dweck & Yeager 2019: 483). What’s more, within the context of educational

research, it holds promise for explaining disparities in teacher stress levels and variations in student performance.

To shed light on these issues, the present thesis examines the explanatory power and practical relevance of mindset theory within educational settings by examining how teachers' beliefs about intelligence as fixed or malleable influence their own psychological well-being and the academic performance of their students.

The current master thesis consists of three main parts. The thesis begins with a literature overview which aims to present the existing body of research on mindsets and create an elaborative account on the ongoing stress crisis in education (Jõgi, Pakarinen & Lerkkanen 2023, Wong, Ruble, Yu & McGrew 2017). For this purpose, an overview of the existing research will be presented which will serve as the foundation for the main research objectives of this master thesis. The research goals are threefold. Firstly, the current study aims to establish the interaction between teachers' mindset and stress. Secondly, the connection between teacher stress and its effects on student academic performance over time. Thirdly, the effect of teacher mindset on students' learning outcomes. Additional analyses were conducted to provide a more comprehensive account of the collected data. The second part of the master thesis deals with presenting the conducted study, the analysis of the collected data, and the results. The last part focuses on contextualizing the results of the current study into the existing research, looking for similarities, differences, and possible ground for improvements and future research. Ultimately, the current study aims to evaluate the efficacy of mindset theory in education and broader psychological research.

1.1. Mindset theory

1.1.1. What is a mindset?

A *mindset*, previously referred to as *implicit theories*, is the set of beliefs that one holds about their capacity to develop their abilities (Hildrew 2018: 1849).

To begin, we will investigate the concept of *fixed* mindset. A tendency toward a fixed mindset involves perceiving intelligence and abilities as innate, unchangeable characteristics (Dweck 2006: 6). This conviction of the static nature of intelligence often compels people to constantly validate their competence—it is their main priority to look capable and intelligent under any circumstances (Dweck 2006). In essence, when an individual believes that they

cannot exceed their inherent capabilities regardless of their attempts (Hildrew 2018), they constantly seek ways to demonstrate and prove to themselves and others their excellence (Dweck 2006). Simply put, in the fixed mindset, one does not want to look or feel inadequate (Dweck 2006) to preserve one's confidence and status in the group (Hildrew 2018). This behavior, however, can result in putting up a façade—an impeccable front of perpetual competence and brilliance (Hildrew 2018). Constantly projecting this polished self-image, however, comes with a huge fear of “dangerous” situations that might expose you as incompetent (Hildrew 2018). When people see their potential as fixed and limited, they constantly seek validation and thus, effort can be seen as a sign of lack of competence while setbacks are indicative of inability (Dweck & Yeager 2019). As a result, in the fixed mindset, continuous effort can be interpreted as a deficiency in skill and thus, weaken determination (Dweck & Yeager 2019).

On the opposite end of the mindset spectrum lies the growth mindset, which is founded on the belief that one's abilities are not fixed, but malleable (Dweck 2006, Blackwell, Trzesniewski & Dweck 2007, Dweck & Yeager 2019). In the growth mindset, people perceive effort, challenges, and practice as the means to develop their abilities and intelligence (Hildrew 2018, Dweck 2006). Thus, those endorsing this mindset embrace setbacks and view them as opportunities to learn from their mistakes and continue to grow (Hildrew 2018). Individuals with the growth mindset believe that their true potential is unlimited and unknown, implying that no one can predict what you can achieve through sustained effort and deliberate practice (Dweck 2006). The main priority is to learn and grow, persistently and tirelessly (Hildrew 2018). In this regard, feedback and criticism are welcomed—one recognizes that perfection is unattainable, and effort is not a sign of inability but rather a tool to improve and become better (Hildrew 2018). Thus, criticism is crucial to pin down the areas for improvement and can complement the learning process (Hildrew 2018).

It is important to mention that these mindsets are not isolated entities. Together, these sets of beliefs form a bigger meaning-making system, which in turn organizes one's attributions, aspirations, motivations, and actions (Hecht, Yeager, Dweck & Murphy 2021). Moreover, a mindset shapes how an individual perceives themselves, thereby influencing their lived reality and potential life paths (Hildrew 2018). In essence, a mindset determines how a person interacts with their environment and how they view themselves (Hecht, Yeager, Dweck & Murphy 2021: 6).

1.1.2. Where do mindsets come from?

For a long time, the idea that mindsets are simply passed on from parents to children was very prominent in the mindset research. Studies in the realm of expectancy effects supported this view, claiming that parents' and teachers' views of a child's intelligence are directly linked to the child's own perceptions of their competence (Frome & Eccles 1998, Jodl et al. 2001). Newly conducted research, however, challenges this "direct model of socialization" (Haimovitz & Dweck 2017: 1850). Several studies have found that there is no direct link between the mindsets of the children and their socializers (Gunderson et al. 2013, Haimovitz & Dweck 2016, Fong et al. 2025). This has been primarily attributed to a misalignment of socializers' mindsets with their actions in critical moments for the child. Researchers discovered that parents' or teachers' mindsets fail to activate in decisive moments when children fall short or succeed (Haimovitz & Dweck 2017). This observation let researchers speculate that parents' intelligence mindsets are not directly transmitted through their parental practices (Haimovitz & Dweck 2017). For example, a parent with a growth mindset might still praise their child's talent instead of effort. Thus, it's parents' beliefs about failure—as either devastating or motivating—that is pivotal for children's mindset development (Haimovitz & Dweck 2017, Liu, Su & Han 2023).

Earlier research focused on praise—as in praising a child's ability or intelligence when they succeed—and researched its influence on children's mindset development (Dweck & Mueller 1998). This assumption has been tested across various age groups, ranging from kindergarten to university students, utilizing various experimental methods. There is a considerable body of research that confirms that receiving process-related praise rather than ability-related is directly linked to the endorsement of growth mindset and resilience to failure (Cimpian, Arce, Markman, & Dweck 2007, Corpus & Lepper 2007, Haimovitz, Wormington & Corpus 2011, Skipper & Douglas 2012, Zentall & Morris 2010). Other responses from socializers have been investigated, such as person-related or process-related criticism, revealing similar patterns (Kamins & Dweck 1999).

Undoubtedly, socializers have a huge impact on mindset acquisition. Children, however, are a part of broader cultural contexts—not simply their domestic or school environments. As can be expected, children develop beliefs about themselves and their competences through their lived experiences in a culture (Haimovitz & Dweck 2017: 1855). Several studies have explored this aspect, providing evidence that Western European cultures are much more

focused on performance while Eastern Asian cultures tend to value effort and resilience in the face of setbacks in the educational context (Heine et al. 2001, Ng, Pomerantz & Lam 2007). Similarly, Asian Indian culture compared to Americans is much more susceptible to the idea that everyone has the potential to become a highly capable individual (Rattan, Good & Dweck 2012). Cultural context-related research shows that the environment in which mindsets are acquired matters. Indeed, the successful implementation of new beliefs depends on the affordances of their environment—whether one’s surroundings prohibit or promote adopting and acting upon the newly acquired beliefs (Hecht, Yeager, Dweck & Murphy 2021: 3). This idea of the classroom where mindsets are socialized by creating cultural norms rather than directly transmitting mindsets from a teacher to a child was further explored (Murphy & Dweck 2010). This observation is crucial for growth mindset interventions, which are yet another way to acquire a mindset.

In fact, mounting evidence shows that mindsets can be taught through interventions (Haimovitz & Dweck 2017: 1850). Growth mindset interventions are specifically designed programs which aim to teach the mechanisms and beliefs behind the growth mindset and how to apply them in real-life situations (Hecht, Yeager, Dweck & Murphy 2021). For example, the metaphor that the brain is like a muscle is a common aspect, building on the idea that the brain “gets stronger and makes new connections when you persevere on hard tasks and overcome challenges” (Hecht, Yeager, Dweck & Murphy 2021: 7). The participants are often encouraged to actively reflect on this message and its role in their own day-to-day (Hecht, Yeager, Dweck & Murphy 2021: 7).

The first research on mindset interventions was published shortly after the turn of the century and sought explanation for the Black-White achievement gap (Aronson, Fried & Good 2002). Over the span of several sessions, the researchers educated their students on the growth mindset (Aronson, Fried & Good 2002). The findings revealed that compared to the control group, the African American students, who took part in the intervention, later showcased higher academic achievements and an increased motivation and enjoyment of their academic work (Aronson, Fried & Good 2002). Subsequent studies conceptually replicated it, supporting the original conclusions (Good, Aronson & Inzlicht 2003, Blackwell, Trzesniewski & Dweck 2007). Recently, it has also become possible to offer growth mindset interventions through self-guided online lessons (Rege et al. 2021). Led by psychologist David Yeager (2019), the National Study of Learning Mindsets evaluated the effectiveness of a brief, online growth mindset intervention conducted among 9th-grade

students in the US, showcasing that growth mindset interventions can have a constructive impact on students' academic performance and motivation (Yeager et al. 2019). With over 12,000 participants, this is the largest study with randomized controlled trial of a growth mindset intervention in the US.

There have been several interventions targeted at students where they are encouraged to gain insights into mindset research and neuroplasticity, which then would be instrumental for their reflections on learning, facing challenges, developing learning strategies, and collaborating with others (Rege et al. 2021: 757). Research has shown that such exercises/ activities are instrumental in changing students' views on challenges as an opportunity to learn and grow as opposed to threats to their self-esteem (Hong et al. 1999). Moreover, students who held beliefs about continuous improvement of their abilities tend to have a more positive outlook on setbacks (Blackwell, Trzesniewski & Dweck 2007, Hong et al. 1999). This positivism is then reflected in their eagerness to learn instead of aiming to avoid challenging situations (Blackwell, Trzesniewski & Dweck 2007, Robins & Pals 2002). Moreover, after the growth mindset interventions, students are more likely to exhibit an increased motivation on a daily basis by showing interest in revising their work or asking for clarification after class (Blackwell, Trzesniewski & Dweck 2007).

Nevertheless, these interventions are successful under certain circumstances (Dweck & Yeager 2019: 488). For instance, a few studies showcased that the favorable effects on academic performance are not considerable, and these are most notable among low-achieving students with students attending poorly performing schools showing the greatest improvement in general (Dweck & Yeager 2019). The intervention proved to be most successful for participants from minority or underrepresented groups (e.g. black students or first-generation university students) (Dweck & Yeager 2019). Nevertheless, high-performing students showed certain improvements beyond their academic performance, such as positive attitude towards challenges (Yeager, Dahl & Dweck 2018). Further investigation has shown that such challenge-seeking perspective encourages people to develop their abilities, which could result in better health and professional development (Carroll, Muller, Grodsky & Warren 2017).

Mindset interventions have been applied outside the realm of education and into the realm of inter-personal relationships (Dweck & Yeager 2019: 491). Yeager and colleagues conducted an in-person workshop with high-school students (Yeager et al. 2011), which

aimed to address peer bullying tendencies in the school. The researchers found that students who endorsed the fixed mindset were more likely to believe that social qualities—like being a good or bad person—are fixed, and, in turn, those who bully others are “bad” while the ones being bullied are “losers” and “unlikable” (Yeager et al. 2011). This black-and-white way of thinking, largely attributed to fixed trait attribution type of mindset, as the reports showed, made them feel more shame and seek revenge (Yeager et al. 2011). After the conducted mindset intervention, when asked to respond to a hypothetical bullying scenario, the students were less likely to feel or react in a negative way (Yeager et al. 2011). Later studies conceptually replicated it—even in a setting of international conflicts—supporting the original conclusions (Yeager, Trzesniewski & Dweck 2013, Halperin et al. 2011).

In recent years, mindset interventions have been utilized in relation to patients struggling with stress and depression (Miu & Yeager 2015, Yeager, Lee & Jamieson 2016, Schleider & Weisz 2016). The results are promising, providing further insights into the therapeutic potential of such interventions by improving patients’ coping and well-being as well as the potential of a relief that they can change (Miu & Yeager 2015, Yeager, Lee & Jamieson 2016, Schleider & Weisz 2016).

Despite the rather limited evidence on mindset interventions, their potential is clearly undeniable and could potentially reduce some educational inequalities at a very low cost (Dweck & Yeager 2019: 488). Such interventions are often praised for being concise and cost-effective, which in turn has been the driving force behind their wider application among diverse groups in large-scale randomized trials (Hecht, Yeager, Dweck & Murphy 2021: 3).

1.1.3. Mindsets and academic achievement

Mindset research began in the classroom (Dweck & Repucci 1973; Dweck 1975; Diener & Dweck 1978) and has since become a promising framework for improving student achievement. In the classroom context, research has shown that the two mindsets determine academic achievement among students. For instance, Claro and colleagues (Claro, Paunesku & Dweck 2016) did a survey among 10th grade students in Chile and the results showcased that across different social classes, students with higher scores on the growth mindset end were performing better at standardized tests.

According to the current body of literature, students with a growth mindset are more likely to perform better academically—especially when facing setbacks—than their fixed-mindset-

oriented peers (Haimovitz, Wormington & Corpus 2011, Hong et al. 1999, Blackwell, Trzesniewski & Dweck 2007, Claro, Paunesku & Dweck 2016, Cury, Paunesku & Dweck 2006, Mangels et al. 2006). This outcome lends further support to the association between mindset and academic achievement. To illustrate this, consider the following scenario, as outlined by Hildrew (2018):

When faced with a challenging task, for example, if we are in a fixed mindset, we are likely to seek to avoid it. What if we fail? That will surely prove that we haven't got what it takes. If we fail, we will be a failure. In contrast, in the growth mindset, we will see a challenging task as an opportunity to test ourselves and to learn and grow from the experience. We probably won't get it on the first attempt, but that's not a problem – we will get some of the way there. On our second attempt, we'll get a bit further. On the third, further still. Eventually, we'll crack it. Then we can move on. (Hildrew 2018: 2)

As illustrated in the quoted passage, mindsets and efforts beliefs are closely intertwined. Embracing a certain mindset distinguishes whether a person has favorable views on effort to enhance their abilities or whether they condemn it as proof for insufficient abilities: “mindsets can play a role in the desire for challenging learning and in the persistence of that desire even in the face of obstacles or failures” (Dweck & Yeager 2019: 484). Various studies have examined this phenomenon (Dweck & Leggett 1988, Hong et al. 1999, Stevenson & Lochbaum 2008, Haimovitz, Wormington, & Corpus 2011). One of the most notable ones was conducted among university students in Hong Kong and examined their attitudes towards taking an English course to improve their low proficiency (Hong et al. 1999). The results confirmed that those who endorsed a growth mindset were more likely to participate in the course (Hong et al. 1999). To provide further confirmation for this phenomenon the results were later conceptually replicated in an experiment during which students' mindsets were manipulated (Hong et al. 1999). The results of the temporarily induced mindsets experiment aligned with the finding of the initial study (Hong et al. 1999).

Similarly, criticism or feedback can be interpreted differently from fixed- and growth-minded people. In a fixed mindset, the line between who we are as a person and our performance are blurred. This means that criticism of our actions is oftentimes regarded as a personal attack—not just a critique of what we've done wrong, but, more importantly, a judgment that challenges our very identity and suggests we are fundamentally lacking (Hildrew 2018). In Nussbaum & Dweck (2008), 29 undergraduates participated in 3 experiments to evaluate their reactions to negative feedback and how they would recover. The results confirmed the hypothesis that the participants' reactions were informed by their

mindsets (Nussbaum & Dweck 2008). After receiving criticism, those who believed in malleable traits sought ways to learn and improve their performance. In contrast, the other participant group tried to reestablish their confidence through social comparison with peers who underperformed (Nussbaum & Dweck 2008).

As can be expected, these views formed through the growth and fixed mindsets have a huge impact on a young person's academic path (Hildrew 2018). In fact, as research in the domain of mindsets continues to expand, there is growing evidence that children's mindsets about their intellectual abilities and skills can determine their aspirations and goals and in turn has a massive influence on their personal journey (Robin & Pals 2002, Blackwell, Trzeniewski, & Dweck 2007, Burnette et al. 2013, Yeager & Dweck 2012). Larger-scale studies have been conducted to test the broader implications of the mindset theory on academic achievement and aspirations. Robin & Pals (2002) carried out one of the first such studies. In the span of 3 years, over 350 students at the University of Berkeley in California, USA were subjected to assessments related to their mindsets, attitudes, goals, academic achievements, and setbacks (Robin & Pals 2002). The conducted correlation analysis solidified the idea that the mindset exerts direct influence on these variables (Robin & Pals 2002). Blackwell, Trzeniewski, and Dweck (2007) conducted a similar study, focusing on the same variables with the addition of attitudes towards effort. The results provided further evidence that mindset is directly associated with one's aspirations, beliefs about effort/ intelligence, and their response to challenges (Blackwell, Trzeniewski & Dweck 2007). The students exhibiting growth-mindset turned out to be more likely to improve their math grades during the 2-year study (Blackwell, Trzeniewski & Dweck 2007).

In the classroom context, however, it is not only the students' mindsets that matter. As can be expected, teachers' mindsets influence their classroom practices and the messages they communicate about intelligence, abilities, setbacks, effort, etc., which in turn impact students' motivation and performance (Rattan, Good & Dweck 2012). Several studies have investigated the practices that teachers employ to create a growth mindset-oriented atmosphere in the classroom (Rattan, Good & Dweck 2012, Yeager et al. 2019, Muenks, Wigfield, Yang & O'Neal 2017). For instance, growth-mindset-oriented teachers were more likely to utilize teaching practices that pertain to ideas about the importance of effort for achievement and dealing with emotions, such as frustration, despair, especially in the face of challenge.

Looking into the association between teachers' mindsets and classroom practices revealed that many educators had a "false growth mindset" (Dweck & Yeager 2019: 490). A false growth mindset characterizes teachers who claim to have a growth mindset but struggle to implement practices that promote it in the classroom (Dweck & Yeager 2019, Kraft, Schwarz & Hooper 2018, O'Rourke et al. 2014). For example, many teachers simply regarded effort as the main component to growth mindset and would praise students' effort, regardless of its effectiveness (Dweck & Yeager 2019). Clearly, the most common causes of a false growth mindset in the classroom typically stem from the misapplication and misunderstanding of growth mindset principles about effort, challenge, intelligence, etc. (O'Rourke et al. 2014, Kraft, Schwarz & Hooper 2018).

Nevertheless, teachers' classroom practices create an environment with certain affordances. Affordances refers to everything that the environment offers (Gibson 1977: 127), including both physical and psychological dimensions (Hecht, Yeager, Dweck & Murphy 2021: 2). Thus, teachers' practices in the classroom can be viewed as affordances that encourage students to take up certain beliefs and perspectives that reflect either the growth mindset or the fixed mindset (Hecht, Yeager, Dweck & Murphy 2021:2). The mindsets of the teachers and the affordances they create, however, can have broader implications for the students that go beyond their beliefs towards efforts, challenges, and collaborative work. For example, a study conducted among college STEM teachers revealed that those who believed that intelligence is a fixed trait were more likely to have bigger achievement gaps between racial/ethnic groups in their classes (Canning, Muenks, Green & Murphy 2019 2019). Another study revealed that growth-mindset-oriented teachers made their students feel more at ease in their classes with students reporting lower anxiety levels about being judged and an increased sense of belonging (Muenks et al. 2020). This, in turn, had a favorable effect on the students' desire to participate, contained interest, and overall better performance in class (Muenks et al. 2020).

Overall, research on fostering a growth mindset atmosphere in the classroom remains relatively limited. Kroeper and colleagues (Kroeper, Fried & Murphy 2022) endeavored to develop a taxonomy of growth-mindset-oriented classroom practices. Similarly, other scholars have examined the most common strategies employed by growth-mindset-aligned teachers to create a more comprehensive framework (Haimovitz & Dweck 2017; Hecht, Yeager, Dweck & Murphy 2021). While these classifications are valuable, growth mindset teaching practices are perhaps best understood as psychological affordances—opportunities

within the classroom environment that meaningfully support and encourage student development (Hecht, Yeager, Dweck & Murphy 2021: 12). Nonetheless, there remains a need for more nuanced, in-depth research to uncover subtler links between teachers' underlying mindsets and their instructional practices, as well as to determine how such practices can be effectively implemented to cultivate a growth mindset in young learners.

1.1.4. Critical voices on mindset theory

The mindset theory has gained a lot of traction in recent years. By publishing the book “Mindset: The New Psychology of Success” (Dweck 2006), Dweck brought her work into pop culture, and her ideas have been circulating in the mainstream for a while now. The research reviewed in the previous sections sounds promising; however, one question persists: Despite the extensive mindset research, is this theory built upon reliable foundations? To seek answers, this section is going to focus on the criticism circulating around mindset theory.

On one hand, her novel ideas have brought motivation back as a central concept in psychology while her continuous research and never-ceasing quest for answers has earned her a good name in the research community (Higgins 2024). Yet, after decades of research on mindsets and their effects on one's achievements, health, wellbeing, etc., there is no consensus about the real effects of mindsets (Yeager & Dweck 2020). For instance, several studies have found no evidence to support the link between academic performance and mindset (Li & Bates 2019, 2020). As a matter of fact, one of the biggest controversies surrounding mindset theory pertains to the outcomes of mindsets (Yeager & Dweck 2020). Recent studies have questioned the validity of such correlation (Macnamara 2018, Burgoyne, Hambrick & Macnamara 2020, Sisk et al. 2018, Li & Bates 2019, 2020), claiming that the effects are heterogeneous and denying the efficacy of the interventions. Others have conducted further analyses, establishing that the effects might differ in different cultural and social contexts (Gelman 2018). The effect sizes have been called into question as well with Macnamara (2018) and Sisk et al. (2018) arguing that they are too small and hence, insignificant. In fact, the greatest obstacle for mindset research has been the heterogeneity or boundary conditions of effects, which has also raised concerns about the replicability of these studies (Yeager & Dweck 2020: 1270). For example, in Li & Bates (2020), a near-replication of the prominent study by Blackwell and colleagues (Blackwell, Trzeniewski, & Dweck 2007) showcased no association between mindset and academic success when

looking into participants' entry or initial grades and how they change over time while going through a challenging transition from high school to university (Li & Bates 2020). The research also refuted the premise that students with lower grades benefit the most from growth mindset (Li & Bates 2020).

Still, some researchers disagree with such statements, supporting the validity of these results (Gelman 2018, Kraft 2020). According to Yeager and Dweck (2020: 1281) the effect sizes standards should not be applied to real-world situations since in day-to-day life, a single factor rarely makes a huge difference. Thus, if a psychological intervention is capable of consistently creating a small, yet real effect on real-world situations, then the results appear promising, especially for education (Kraft 2020). In this regard, the effect sizes must be properly evaluated since some outcomes, such as grades or depression rates, are difficult to change (Burnette et al. 2023: 175). Thus, even if an intervention provides small effect sizes, if it is cost-effective, then it might offer a promising solution (Burnette et al. 2023: 175). Nevertheless, relying solely on statistical significance and effect sizes can be misleading in psychological research (Gelman 2018). Instead of striving for replicability, researchers should focus on contextual variability, which takes into account real-world complexity (Gelman 2018).

In conclusion, there is a growing body of research that goes as far as to claim that the theory "appears to rest on shaky foundations" (Li & Bates 2020). However, as the metascience movement is growing in popularity, and the focus on replicability is constantly increasing, the problem of distinguishing between studies that show gaps in the theory and those that only provide more information about the efficacy or lack thereof of the theory only intensifies (Yeager & Dweck 2020). Instead of focusing on p-values, a more multi-dimensional evaluation approach could potentially be a better solution (Gelman 2018). For instance, other factors, such as costs and scalability, should also be taken into consideration when evaluating the efficacy of a theory (Kraft 2020). Nevertheless, as a recently emerged theory, voicing concerns is beneficial to refining the theory. Still, it seems that it is going to take years before we have clear evidence to answer the question: "Which claims in the growth mindset literature still stand?" (Yeager & Dweck 2020: 1270).

1.2. (Teacher) Stress

1.2.1. Definition

Stress is inherent to our lives (Bidi et al. 2024). Moderate stress levels can serve as a catalyst for motivation and enhanced performance; however, when stress exceeds an optimal threshold, it can become detrimental to one's physical and mental health (Ganzel, Morris & Wethington 2010). In fact, how one reacts to stressors is essential to one's quality of life. Understanding these mechanisms, however, begins with defining what stress means.

Generally, the word "stress" is used synonymously to describe a kind of strain, demand or load (Vandenberghe & Huberman 1999). The term stress first emerged in the 1950s with the innovative work on psychological stress by Selye, who provides the following definition:

"Stress is the nonspecific response of the body to any demand made upon it. [This demand] requires adaptation to a problem, regardless of what that problem may be. That is to say, in addition to their specific actions, all agents to which we are exposed produce a nonspecific increase in the need to perform certain adaptive functions and then to reestablish normalcy, which is independent of the specific activity that caused the rise in requirements. This nonspecific demand for activity as such is the essence of stress." (Selye 1973: 692-3)

Selye's definition is widely accepted in the research community, however, other definitions abound, adding new dimensions to our understanding of stress. For example, Olson and colleagues (Olson, Sprenkle & Russell 1979) emphasize that stress might stem from real-life as well as imaginative conditions which demand actions. Other definitions conceptualize stress is not simply an automatic response, but rather the outcome of an individual's evaluation of both the external stressor and their perceived ability to cope with it (Lazarus & Folkman 1984). This definition also implies that stress can be experienced differently from individual to individual. The World Health Organization (WHO), on the other hand, defines stress as "an imbalance between job demands and workplace environment or human resources," (cited in Bidi et al. 2024) adding another layer to the definition, related to work.

Pertaining to work-related stress, in the 1970s the term "teacher stress" appeared in the title of Kyriacou & Sutcliffe's work (1977) for the first time. In the 1960s, researchers were beginning to identify teachers' areas of concern, primarily focusing on factors leading to job dissatisfaction (Kyriacou 2001). Systematic investigation into teacher stress began to gain momentum in the 1970s and experienced substantial growth through the early 2000s (Kyriacou & Sutcliffe 1977, Kyriacou 2001). Within this growing body of literature, various

conceptualizations of the term ‘teacher stress’ began to emerge. One of the first definitions of the term is by Leach (1984), who interprets teacher stress as follows:

“a state of the individual in which physiological and biochemical changes in the organism (such as increased heart-rate, blood pressure or the release of adrenocorticotrophic hormones into the bloodstream) occur as a result of some discrepancy between the teacher’s perceived work demands and ability, or an anticipation of negative consequences (such as a threat to self-esteem or well-being) following a failure to cope with demands seen as important by self or others, or following the frustration of attempts to apply skills effectively to achieve goals perceived as important by the individual by factors in the school environment.”
(Leach 1984: 160)

Leach’s definition has been praised for elaborating on the relevance of environmental factors in stress responses (Wieczorek 2016). Kyriacou’s definition of teacher stress also stresses the importance of the environment, emphasizing that teacher stress is the experiencing of various negative emotions, “such as anger, anxiety, tension, frustration or depression, resulting from some aspect of their work as a teacher” (Kyriacou 2001: 28). Similarly, other definitions put a strong emphasis on negative emotions such as anxiety, frustration, and depression often pertaining to educational administration (Collie, Shapka & Perry 2012, Khan, Shah, Khan & Gul 2012). Due to its accuracy and simplicity, however, Kyriacou’s definition has been widely accepted in research (Wieczorek 2016).

As a non-homogeneous group, teachers might vary drastically in their perception of the very same working conditions (Herman, Reinke & Eddy 2020). As Rosenberg (2010) points out, “Although research has highlighted a number of common sources of stress among teachers, whether an individual teacher finds these situations stressful depends on the interaction between the situation and the teacher’s individual characteristics” (Rosenberg 2010: 4). For instance, individual differences, such as skills, personality traits, values, and circumstances, play a decisive role in which of these work-related aspects are a cause of stress (Kyriacou 2001). Researchers have identified different stress profiles which vary from individual to individual and are strongly linked to their coping mechanisms (Bidi et al. 2024). Indeed, an individual’s reaction to stressors depends on their actual and perceived ability to manage it successfully (Vandenberghe & Huberman 1999). Additionally, these sources of stress could vary on a national level based on different school system models, educational policies, and societal attitudes regarding the teaching profession and education (Kyriacou 2001).

1.2.2. Stressors in the classroom

Despite these individual differences, there is a consensus among researchers that teaching is one of the most demanding professions (Travers & Cooper 1996). Moreover, teacher stress appears to be ubiquitous across different cultures and nations (Harney 2008), although there might be differences between some countries. Previously conducted surveys have yielded results “that about one quarter of schoolteachers regard teaching as a ‘very or extremely stressful’ job” (Kyriacou 2001: 29). Indeed, there are several aspects to the teacher's work that can be identified as stressors. These include engaging unmotivated students, sustaining student discipline, managing time limitation and work volume, navigating through changes, interpersonal conflicts, and external evaluations, struggling with self-worth as well as conflicting and unclear role expectations, dealing with administrative duties and unsatisfactory workplace environment (Kyriacou 2001: 29). Beyond these, other “newer” aspects come along, such as the increased use of technology in the school system and keeping pace with advancing technologies on top of their professional duties (Wekerle & Kollar 2022). In addition, one should also consider the emotional involvement of teachers in their job. In fact, a low level of depersonalization is considered one of the most common causes of stress among teachers (Mnjokava, Okendo & Wambiya 2018).

To create a more comprehensive taxonomy of teacher stress, Travers and Copper (1996) have divided stress-inducing situations into six main categories: (1) stressors that are constituent part of the teaching profession, such as varying workload and working hours, unsatisfactory working conditions; (2) ambiguous or conflicting roles of the teacher; (3) social connections to colleagues, students, parents, etc.; (4) professional development; (5) school administration involvement, and (6) work-life imbalance. These categories are illustrated in the following excerpt by Woods (1989):

“A potentially stressful situation is set up when a teacher's personal interests, commitment or resources not only get out of line with one or more of the other factors, but actually pull against them. The classic case is having too much work, plus a strong moral imperative to do it, and not enough time and energy within which to do it. A variant on this basic theme is being pressed to do more work, given fewer resources with which to do it, and then receiving no reward or recognition, and worse, perhaps censure, when it is nonetheless accomplished. (Woods 1989: 84).

When considered alongside the work of Travers and Copper (1996), the quote draws attention to several of their categories. This is particularly striking given that Woods (1989) identified similar issues even before Travers and Cooper's classifications, suggesting that

little has changed, and these factors are still inherent to the teaching profession. Even more, this quote highlights that teacher stress is not the result of one-time occurrences but rather is accumulative and arises on a day-to-day basis. Its accumulative nature is, in fact, a cause of concern since higher levels of stress are strongly associated with burnout (Skaalvik & Skaalvik 2017). Unfortunately, research has shown that stress and burnout go hand in hand, with the latter being considered the ultimate outcome of prolonged occupational stress (van Droogenbroeck, Spruyt & Vanroelen 2014).

1.2.3. Is foreign language teaching even more stressful?

Undoubtedly, the teaching profession is inherently demanding due to its complex organizational and emotional nature (Vanderberghe & Huberman 1999). In this respect, language teaching is not exempt from the stress crisis among educators. In fact, some argue it is even more demanding due to some additional and unique stressors (Piechurska-Kuciel 2011).

To begin with, whereas teachers of other subjects typically use their native language as the medium of instruction, foreign language teachers conduct their lessons in the target language (Wieczorek 2016: 235). As research has shown, most foreign language teachers report a lack of confidence in their language abilities, regardless of their proficiency (Horowitz 1996). An additional stressor for L2 teachers could be the fact that they often teach across different grades and proficiency levels, which requires them to change their language input to accommodate each class (Harmer 2003). It is also important to note that being proficient in the language they teach does not suffice since foreign language teachers are expected to have an in-depth understanding of the target culture (Werbinska 2005). Moreover, students often come to class with certain emotions pertaining to the specific language or the culture (Wieczorek 2016), and teachers are expected to navigate these affective factors sensitively to create a supportive and effective learning environment. Consequently, such challenges render language teaching an emotionally draining profession (Sadoughi, Hejazi & Khajavy 2024).

Adding to the complexity of the language teaching professions is the fact that teaching a foreign language entails the acquisition of four main languages-related skills. Listening, speaking, writing, and reading are crucial to being able to use a language freely (Harmer 2003). To teach these skills, however, language educators need to incorporate a variety of skills, methods, and tools, such as authentic and/ or multimedia materials, which, as can be

expected, may be very time-consuming and stressful (Wieczorek 2016: 235). Parallel to in-class activities, language learning also requires students to allocate time for individual studying (Wieczorek 2016). It is the teacher's responsibility, however, to teach students to be autonomous learners. This can be a particularly challenging endeavor since autonomous learning largely depends on personal motivation, discipline, and eagerness to learn (Komorowska 2011). To compound matters, the process of learning a foreign language is inherently slow and time-intensive, which necessitates sustained effort and perseverance from teachers before seeing any tangible outcomes from their teaching efforts (Sadoughi, Hejazi & Khajavy 2024: 1). Consequently, the lack of any immediate evidence of the effectiveness of their instruction may lead foreign language teachers to experience feelings of incompetence and stress, which could ultimately contribute to burnout (Sadoughi, Hejazi & Khajavy 2024: 1).

An additional factor that exacerbates the challenges of the teaching profession are language-teaching policies. Foreign language teachers are expected, on one hand, to follow the guidelines while, on the other, choose appropriate teaching methods and materials that align with their own teaching style and their students' needs (Wieczorek 2016: 244). Unfortunately, due to the large number of students in a class, it is getting increasingly harder for teachers to consider individual differences in proficiency, learning styles, and motivation among students (Wieczorek 2016: 244).

Overall, language teaching is a highly challenging profession, which demands a unique set of skills (Sadoughi, Hejazi & Khajavy 2024). The inherent challenges to this occupation, however, may pose professionals at greater risk of high stress levels and even burnout (Valeo & Faez 2014). Although teacher stress is a widely investigated phenomenon, stress among foreign language teachers remains underresearched with only a limited number of studies currently available (Liu & Wu 2021, Zarrinabadi, Mohammadabadi & Abbasi 2023).

1.2.4. Implications of teacher stress

Potentially all individuals experience work-related stress due to lack of resources, conflicts with colleagues, or lack of efficient organizational structures (Muhonen, Pakarinen & Lerkkanen 2022). Education, however, is deemed to be among the most stressful professions. Some report that educators experience the highest burnout rates among all social professions (Skaalvik & Skaalvik 2014). What warrants concern in these statistics is the fact that elevated stress levels may pose significant risks to well-being, including mental and physical health

(Rosenberg 2010). The physiological effects range from frequent headaches, disturbed sleep schedule, elevated blood pressure, to muscle tightness, chronic fatigue, and low energy (Travers & Cooper 1996, Vandenberghe & Huberman 1999). Cognitive and emotional symptoms include restlessness, anxiety, depression and low self-esteem (Travers & Cooper 1996, Vandenberghe & Huberman 1999). Behavioral ramifications may present as issues such as appetite disturbances, excessive use of tobacco, alcohol, and/or drugs, procrastination, irritability, decreased productivity and absenteeism, and disengagement from teaching duties (Travers & Cooper 1996, Vandenberghe & Huberman 1999). Broader implications of stress that also pertain to the educational system include educator absenteeism, high teacher turnover, and premature exit from the profession due to excessive job-related stressors (Rosenberg 2010).

In addition, teacher stress can have considerable implications for students as well. In fact, students spend about 15,000 hours in the school classroom, making it one of the environments where young people spend the most time while growing up (Oberle & Schonert-Reichl 2016). Research has provided some evidence that the classroom environment is one of the most reliable predictors of the success and well-being of students (Eccles & Roeser 2013, Jennings & Greenberg 2009, Dimitropoulou et al. 2025). As can be expected, a positive climate at the school can foster student success, while experiencing stress in the classroom may be deteriorating to young people's health and success (Hamre & Pianta 2006, 2005). In this regard, teachers are a decisive factor in establishing a favorable atmosphere in the classroom (Jennings & Greenberg 2009). Unfortunately, stressed teachers lack enthusiasm and motivation for teaching and often deal with feelings such as irritability, impatience, and frustration (Poon et al. 2019). Moreover, when teachers are continuously put under stress, they are more likely to use more punitive and reactive—as opposed to responsive—classroom management strategies (Oberle & Schonert-Reichl 2016: 31). And while students thrive under the condition of perceived support from their educators and caretakers (Goodenow 1993), stressed teachers are unlikely to be able to provide adequate support for their students. Consequently, the students might feel like their needs are unattended in this hostile classroom environment (Oberle & Schonert-Reichl 2016: 31). This unfavorable classroom climate might even result in a more troublesome student behavior, causing even more stress for both students and teachers (Hastings & Bham 2003).

The stress crisis among teachers is further exacerbated when considering that there is a growing body of evidence that the emotions and moods transfer between people (Hatfield,

Carpenter & Rapson 2014). This phenomenon is widely known under different terms, such as emotional transfer (Parkinson 2011), the social induction of affect (Epstude & Mussweiler 2009), or affective linkage (Elfenbein 2014), and emotional contagion (Hatfield, Cacioppo, & Rapson 1994). The latter of those is presumably the most widely known and was initially used by Hatfield and colleagues (Hatfield, Cacioppo, & Rapson 1994) to show the resemblance between the transfer of germs and emotions. In both cases, the exchange happens between the sender and receiver automatically, meaning both sides are unaware of the on-going process of transfer (Wróbel & Imbir 2019: 438). Regarding stress, Buchanan and colleagues were among the first ones to provide evidence that stress can be contagious by testing the cortisol levels of impromptu speakers and their observers in the panel (Buchanan, Bagley, Stansfield & Preston 2012). The results showed that there is a positive association between the cortisol released by the speakers and the observers (Buchanan, Bagley, Stansfield & Preston 2012).

In the context of teacher stress and classroom environments, it becomes clear the emotional contagion poses a serious threat to the well-being of students. For instance, a study among 406 students across 17 classes showcased that higher teacher burnout levels predicted significantly elevated morning cortisol in students (Oberle & Schonert-Reichl 2016). A similar study conducted in preschool and childcare setting yielded comparable results (Schlueter et al. 2024). The same effects have been observed in VR learning setting, providing further evidence that emotional transfer occurs even in virtual environments and not only in face-to-face interactions (Dirin et al. 2023).

1.2.5. Growth mindset interventions: The solution to this crisis?

There is a growing body of research on stress reduction programs targeted specifically at educational personnel. Fortunately, there is strong evidence that many of these interventions can have a positive effect on teachers in terms of emotional regulation, job satisfaction, and overall well-being. Some of the interventions that have been researched and have yielded preliminary success include mindfulness-based approach (Hidajat, Edwards, Wood, & Campbell 2023, Braun, Roeser & Mashburn 2020), movement-based programs (Kim & Gurvitch 2020, Ancona & Mendelson 2014), relaxation therapy (Kaspereen 2012) as well as lifestyle-related interventions (Walburg et al. 2022).

Only recently did researchers begin testing growth mindset interventions as brief mental health tools, particularly for depression and anxiety in adolescents. The first study of this

kind involved a single, 30-minute-long, self-administered session (Schleider & Weisz 2017). While the changes in symptoms were only moderate, the brief duration of the intervention made the results promising, particularly as it outperformed another comparable clinical program (Schleider & Weisz 2018: 167). Subsequent studies reported similar outcomes, further reinforcing the effectiveness of these types of interventions (Verberg, Helmond, Otten & Overbeek 2021; Wang et al. 2025)

More recently, the growth mindset framework has been adapted to professional and organizational settings, such as leadership development (Johnston 2017). For instance, a single-session intervention among first-semester nursing students showed significant reduction in the participants' fear of failure (Lewis, Williams & Dawson 2020). In addition, an intervention conducted with health-professional students resulted in significantly increased resilience and considerable reduction in their perceived stress levels (Calo, Judd & Peiris 2024). Moreover, growth mindset interventions showed an improvement in job satisfaction despite higher stress levels (Kondratowicz & Godlewska-Werner 2022). In education, Frondozo and colleagues have investigated the impact of growth teaching mindset on teachers' well-being (Frondozo, King, Nalipay & Mordeno 2022). Similarly to previous studies, the results showed that growth teaching mindset was strongly associated with higher enjoyment and engagement and lower levels of anxiety and anger (Frondozo, King, Nalipay & Mordeno 2022: 5030). There was also a significant direct effect of mindset on engagement and an indirect effect through enjoyment (Frondozo, King, Nalipay & Mordeno 2022: 5031). Other studies have provided similar results (Nalipay et al. 2021). Growth mindset interventions have been applied to pedagogical teaching, resulting in improved classroom and emotional management (Rissanen et al. 2021).

Overall, growth mindset interventions are gaining traction in various contexts as a means for reducing stress and increasing job satisfaction. Moreover, the existing body of research shows promising preliminary success. However, more in-depth investigations are needed to provide further evidence for its efficacy.

1.3. Rationale and hypotheses

1.3.1. Rationale

The present master thesis aims to investigate the complex interaction between stress levels and mindset of teachers, and how these affect student performance. This is a topic of

increasing importance given the exacerbating stress crisis among teachers, which negatively impacts teachers' mental and physical health while it also interferes with students' well-being. As already discussed in Section 1.2.4., there is a strong, direct link between teachers' mental health and the classroom environment (Jennings & Greenberg 2009). Furthermore, with foreign language teachers being exposed to presumably even higher levels of stress due to the complexity of foreign language teaching and learning (see Section 1.2.3.), this study addresses the important intersection between linguistics and educational psychology. Both teachers' stress levels and mindset impact their classroom practices, communication styles, and language use, which, undoubtedly, are instrumental factors in language acquisition of students.

Mindset theory has been widely applied to educational contexts in various settings and among diverse populations (see Section 1.1.3.). There is an extensive body of research confirming the direct link between growth mindset and higher student achievement. Nevertheless, mindsets' influence on teacher stress and how that stress impact students' academic performance remain underexplored. Additionally, the potential mediating role of teacher mindset in the transmission of stress affects to students is poorly understood, especially in foreign language classes where mindset and stress could differentially influence language learning and the classroom atmosphere.

Thus, this study has three main objectives, which in turn aim to address key gaps in the literature by examining: (1) the relationship between teachers' growth mindset and their stress levels, (2) the impact of teacher stress on student academic performance, and (3) the direct influence of teacher mindset on student achievement. Gaining a more in-depth understanding of these links is crucial for developing interventions targeted at teaching personnel. Such interventions hold the potential to enhance both teacher well-being and student academic achievement in a time- and cost-effective manner. Ultimately, reducing teacher stress levels can be beneficial to a more equitable and efficient educational environment, which values the well-being of both professionals and students.

1.3.2. Hypotheses

The first hypothesis of this study pertains to the link between mindset and stress levels of teachers. In this regard, previous research has found that teachers who endorse a growth mindset tend to utilize adaptive coping strategies and display greater resilience alongside enhanced professional effectiveness compared to their fixed-mindset colleagues (Fives &

Buehl 2016). Research is indicative that growth mindset beliefs can be beneficial to overcoming occupational stress by installing a sense of control and promoting persistence in the face of challenges (Blackwell, Trzesniewski & Dweck 2007). Mounting evidence suggests that professionals endorsing the growth mindset are less likely to report burnout symptoms or low levels of job satisfaction (see Section 1.2.5.). These findings highlight a promising buffer against teacher stress. Moreover, given the extensive research on the adverse effects of stress on teachers' and students' well-being and learning efficacy, investigating the link between mindset and stress is timely and increasingly imperative.

Hypothesis 1: Based on this evidence, this study hypothesizes that teachers with a stronger growth mindset will report lower levels of occupational stress.

Secondly, this study aims to examine the effects of teacher stress on student performance. It has already been established that teacher stress has far-reaching effects that go beyond the individual educator and affect both the classroom environment and potentially, student outcomes. Studies have shown that high teacher stress levels are associated with decreased quality of instruction and lower student engagement (Pas, Bradshaw & Hershfeltd 2012). Furthermore, high stress levels negatively impact one's emotional availability, which is crucial component in the classroom for supporting student learning and emotional well-being (Jennings & Greenberg 2009). Emerging evidence on the dangers of emotional contagion in the classroom should also be taken into consideration. Several studies have documented that students of stressed teachers showed elevated cortisol levels (Raver, Murchake & Chalk 2018), signaling that teacher stress can be directly linked to tangible biological responses in students. Based on these findings, it is reasonable to infer that students whose teachers experience high stress levels are more likely to underperform academically compared to peers taught by teachers reporting lower stress levels.

Hypothesis 2: Therefore, the present study hypothesizes that students whose teachers exhibit higher stress levels will demonstrate poorer academic performance over time than students of teachers with lower stress levels.

The third and final hypothesis of this study attempts to shed more light on the impact of teachers' mindset and the performance of their students. This potential interference has generated significant research attention. Previous research has provided evidence that teachers endorsing a growth mindset tend to utilize teaching practices that foster student motivation and encourage persistence in the face of failure or setbacks (Haimovitz & Dweck

2017). These beliefs are, undoubtedly, instrumental in creating a learning environment conducive to higher academic outcomes. Furthermore, students who actively implement growth mindset beliefs in the classroom demonstrated better academic outcomes (Yeager et al. 2019). Most notably, the lower-achieving students benefited the most from the growth mindset classroom environment (Yeager et al. 2019). However, the direct link between teacher mindset and student achievement warrants caution since other factors, such as environmental and individual differences, may be at play (Claro, Paunesku & Dweck 2016). Consequently, the extent to which teacher's mindset affects student performance remains largely unclear.

Hypothesis 3: Accordingly, this study hypothesizes that students taught by teachers with stronger growth mindsets will achieve higher academic performance across testing sessions compared to peers whose teachers have weaker growth mindsets.

2. Methodology

As discussed in the theoretical part of the current master thesis, the existing literature suggests a link between teachers' stress levels, their mindset, and their students' academic outcomes. The previous chapter sought to provide contextual overview of the topic by examining key findings, identifying gaps in the theory, and discussing critical perspectives.

This chapter marks the beginning of the empirical part of the master thesis and presents the methodology used to address the main research objectives, as outlined in Section 1.3. More specifically, the current chapter aims to describe the research design, participant selection, data collection methods and instruments, and the statistical procedures employed for the data analysis.

2.1. Research design

The following study utilizes quantitative research design to test the hypotheses presented in Section 1.3. Quantitative methods were chosen as the most suitable approach since they allow for the collection and analysis of numeric data. Furthermore, this type of methods is particularly suitable for statistical processing of data, which in turn enables the detection of potential correlations and causal relationships between variables. Given the study's incentive to measure psychological constructs, such as stress and mindset, alongside objective performance indicators of students (i.e. test scores), working with quantitative methods would be especially suitable since they offer structured and systematic means to evaluate the predefined hypotheses.

The primary data collection methods include standardized and non-standardized questionnaires (for measuring stress and mindset of teachers) as well as non-standardized, curriculum-based assessments to evaluate student performance. Standardized tests are widely accepted in psychological and educational research since they are considered a reliable and efficient tool for measuring individual differences. Furthermore, tests and questionnaires are particularly suitable when working with a larger sample. These instruments optimize the data collection process and allow for the generalizability of the findings. In this regard, both questionnaires and tests enable the quantification of subjective constructs, such as mindset, stress, and student performance, which in turn makes the use of statistical analysis possible.

The present study has a correlational design as it aims to identify potential relationships between the three variables. Moreover, teacher data was collected at a single point in time, while student performance was measured at two points in time in the span of two months to track any occurring changes (i.e. increase or decline in student performance over time). Hence, the design of the current study can also be deemed as partially longitudinal. Teachers' mindset and stress levels were measured only once, based on the premise that these variables remain relatively stable over such a short period of time and to minimize the burden on participants. In contrast, student performance was evaluated at two points in time, spaced approximately two months apart, to measure potential changes in student outcomes over time. Bearing this in mind, it becomes clear that this design allows for the assessment of links between teachers' characteristics, such as mindset and stress, and their potential impact on students' performance. In this way, there is no need for manipulation of the variables. Clearly, this study design reflects the study's objectives, but it also allows for the anonymization of the data, protecting the privacy of all parties involved.

In addition, the study's quantitative design allows for the operationalization of the variables into measurable constructs. The use of (non-)standardized questionnaires and tests enables clear operationalization of the variables. This, in turn, allows for an objective and consistent measurement of teachers' stress and mindset as well as student performance across all participants.

Overall, the design of the current study has been developed to reflect the ethical and logistical constraints and affordances of real-life educational setting. More importantly, it aims to provide reliable, easy to interpret data that can be used to test the study's hypotheses. Furthermore, the current design of the study supports the reliability and replicability of the results. It also enables the application of statistical techniques to control for any confounding variables. This provides solid foundations for the study's conclusions.

2.2. Participants

Both teachers and students participated in the current study, all from the same elementary school located in the town of Stara Zagora, Bulgaria. In line with the primary objectives of the study—and namely, to investigate the impact of foreign language teachers' stress and mindset on student performance—only foreign language teachers were included as participants. Correspondingly, the assessment of students' performance was conducted through language tests, reflecting their foreign language classes curriculum.

A total of five foreign language teachers participated in the study. All of them teach English across grades 2 to 7. The teacher group was relatively homogenous, consisting entirely of female participants aged between 45 and 60 years. In addition, all the teachers had over 25 years of teaching experience. To recruit participants, the study employed convenience sampling. The sample comprised former teachers of mine as well as professional contacts through a relative, who is also a teacher at the same school.

As for the student participants, only students in grades 3 through 6 were included in the study. While the participating teachers also taught 2nd and 7th grade, these two groups were excluded from the research for specific reasons. In the Bulgarian educational system, students begin learning a foreign languages—most commonly, English—in 2nd grade. However, due to their limited exposure to the language at the time of the data collection, second-grade students were considered unlikely to produce reliable results on student performance. Seventh-grade students, on the other hand, were excluded because of their significantly increased school-related workload. In Bulgaria, students in 7th grade prepare for two high-stake national exams at the end of the school year, which ultimately—based on their exam grades—determine the high school they can enter to continue their secondary education. As can be expected, these exams demand a year-long preparation and impose a considerable burden. Therefore, 7th graders were excluded from the present study to avoid adding to their already heavy workload.

Teacher	Grade 3	Grade 4	Grade 5	Grade 6
SD			• • •	
HG				• • •
RA		• • •		
CP			•	• •
SG	• • •			

Table 1. *Selected classes per teacher and their grade-level distribution in the testing sessions.*

Consequently, the student sample included students in grades 3 through 6. Each teacher was asked to select 3 of their own classes to participate. Given the time constraints of the study—the data collection had to be completed within one week per session—the selection of the classes was largely determined by scheduling feasibility. The accompanying table illustrates the grade distribution of the selected classes across the participating teachers (see Table 1. above). As indicated, the student sample represented a relatively heterogeneous group in terms of age and grade levels.

2.3. Data collection methods and materials

Three main procedures were utilized to collect data for the current study: two instruments administered once for teachers and one assessment procedure for students which was administered twice. All data collection procedures relied on paper-based materials to ensure accessibility and alignment with standard classroom practices. Furthermore, all collected data was entered into Excel spreadsheets and evaluated using predefined formulas to minimize human error and ensure consistency across all materials and testing sessions.

The Wilson Stress Profile for Teachers (WSPT; Wilson 1979) was utilized to assess the teachers' stress levels (see Appendix 1). This is a 36-item, self-report instrument which was specifically designed to assess teacher stress by considering various aspects of the teaching profession that contribute to occupational stress among educators (Wilson 1979). There are nine subsections, which correspond to specific domains of stress, such as Student Behavior, Employee/Administrator Relationships, Teacher/Teacher Relations, Parent/Teacher Relations, Time Management, Intrapersonal Conflicts, Physical Symptoms of Stress, Psychological/Emotional Symptoms of Stress, and Stress Management Techniques (Wilson 1979). Each subsection comprises of 4 items or statements. Participants must rate each one on a five-point Likert scale ranging from 1 = Never to 5 = Very often. Each subsection has a score ranging between 4 to 20, while the total test score ranges from 36 to 180. This scale allows for classification of stress levels as low, moderate, or high. As a standardized, quantitative instrument, WSPT is optimal for research projects that require diagnostic clarity and comparability. Although the instrument was developed over 40 years ago, it covers various aspects of the teaching profession, capturing stress factors that other, more recent tests neglect. Its continued relevance in teacher stress research is evident from its more recent application in academic works (e.g. McDowell-Bush 2024). Furthermore, prior to the data collection phase, a pilot study was conducted in which two teachers were asked to complete several standardized stress assessment instruments. Based on their feedback on clarity and relevance, the WSPT was selected as the most appropriate instrument for the present study.

Given the main research objectives of this master thesis, teachers' mindset was evaluated through a researcher-designed mindset questionnaire (See Appendix 1). The mindset questionnaire was devised by me due to the absence of a widely acknowledged standardized instrument for measuring teacher mindset. While mindset research has been widely applied in educational settings, standardized instruments specifically tailored for teacher remain

limited (Laine & Tirri 2023). The mindset questionnaire was based on a set of questions used for mindset self-evaluation and reflection (e.g. see Dweck 2006). The mindset questionnaire consisted of statements reflecting both growth and fixed mindset orientations. In total, the test included 15 items—7 items were related to the growth mindset and 8 to the fixed mindset. The scoring was adapted to the type of statement. For example, growth mindset-related responses were rated in the following way: the option “Strongly agree” received 3 points while “Strongly disagree” didn’t score any points. For the fixed mindset-related items, the scoring was reversed: “Strongly disagree” received 3 points while “Strongly agree” was scored 0 points¹. In addition, an open comment section was provided for each item for participants to elaborate on their responses.

Although all instruments targeted at teachers were originally in English², they were translated in Bulgarian to ensure clarity and minimize the risk of misinterpretations. While all teachers were proficient in English, providing the evaluation materials in their native language increased reliability of the results by ensuring full comprehension of the abstract concepts related to stress and mindset. In addition, both instruments were administered once during the first session of the study in October under the assumption that these variables remain relatively stable over the course of the two-month research period. Furthermore, the teachers completed the questionnaires in paper format. This was a deliberate choice to facilitate participation and reduce potential digital access barriers. The teachers were given a two-day period to complete the assessments at home. Upon collection, their responses were anonymized using individual codes and transferred into Excel spreadsheets. The collected data was scored using predefined formulas to minimize human error and ensure consistency across all tests and participants. Moreover, each teacher was assigned a TeacherID to organize each teacher’s results and match them to their students.

Student performance was assessed using custom-designed, curriculum-based English language tests. There were two testing sessions for the students—one in October 2023 and one in December 2023³. Each test comprised of 15-25 questions, including closed and open-ended format. The tests were devised after consulting the participating teachers and reflected the content taught in class as well as the typical question formats that students are

¹ For a more detailed overview of the scoring system, see Appendix 1.

² It is the English versions that are provided in Appendix 1. The Bulgarian versions are not provided in the Appendix.

³ The tests are available in the Appendix. Appendix 2 comprises of the tests from the October session, while Appendix 3 includes all tests from December.

accustomed to. For example, one of the teachers asked for a single-choice test since she was just introducing this format to her students. Another teacher specifically instructed me to avoid closed format since she only included open-ended questions in her assessments. The content of the tests was also discussed with teachers to ensure that the material in the tests had been well-practiced in class. By doing so it was ensured the authentic and reliable assessment of the students' classroom learning. In this regard, it is crucial to note that the primary aim of these tests was not to assess the overall English language proficiency of the students—which is usually done through standardized assessment instruments—but rather to measure how well students had comprehended and could apply the material practiced in their lessons.

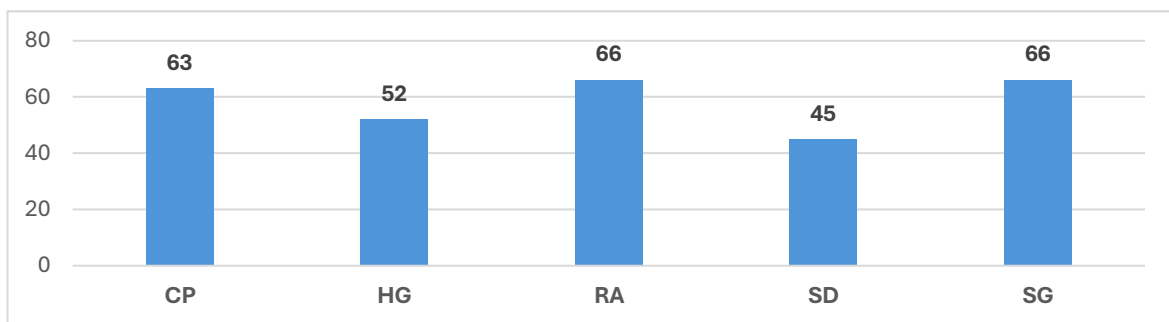


Figure 1. Number of student per teacher who took part in the testing sessions.

The tests were administered in class, during the regular English lessons. The participating teachers agreed to allocate 20-25 minutes from their lesson for the tests to ensure the reliability of the results. The assessments were in paper format since this was the school's common testing form. For organizational purposes, students were initially required to write their names on their tests. However, all the personal details were removed during the data transfer onto the Excel spreadsheets. Students who participated only in one of the testing sessions were excluded from the data set. Thus, only students who took part in both sessions were included in the final dataset used for the subsequent statistical analyses. Exact numbers of the students who participated in the study after the data preparation procedure are presented in Figure 1. above. As illustrated in the table above, the number of students per teacher varied. Teacher SD had the lowest number of students with 45, while teachers RA and SG had 66 students taking part, which was the highest number. Regardless of these differences, the student sample size was adequate for the purposes of the current study. To ensure anonymity and improve the organization of the dataset, each student was assigned a unique Student ID. These code names, in turn, allowed for the consistent tracking and comparison of the students' individual results across the two testing sessions. Moreover, the

students' responses were collected on an Excel spreadsheet and analyzed through a scoring code developed for each test to eliminate potential errors in the evaluation. Finally, to account for the differing number of questions in each test, the final scores were calculated as percentages to facilitate comparison. Through the Student and Teacher IDs, each student was matched with their teacher.

Overall, the data collection procedure combined both standardized and custom-made instruments to capture the potential interconnection between teacher stress, mindset, and student performance.

2.4. Data analysis

The statistical analyses were conducted in accordance with the three hypotheses outlined in section 1.3. The choice of statistical analysis was also informed by the data structure and types of variables. Furthermore, the statistical methods employed by the current study aimed to provide reliable means to assess the interactions between teacher psychological factors, such as stress and mindset, and student performance.

To test the first hypothesis regarding the relationship between teachers' stress and mindset, exploratory correlation analysis was performed using JASP (JASP Team 2025). Due to the small sample size ($n=5$) and the non-normal distribution of the data (which was indicated by Shapiro-Wilk tests for normality), Spearman's correlation was chosen for these analysis. In addition, given the small sample size ($n=5$), complementary descriptive statistics were provided for a more comprehensive overview.

For hypotheses two and three, investigating the impact of teacher stress and mindset on student performance over time, linear mixed-effects models were performed in RStudio (RStudio Team 2023). The dataset included individual student test scores from each session (October and December) with students nested within teachers and repeated measures across time. Time was presented numerically in the code (October = 1, December = 0) to facilitate the integration of time as a variable in the statistical model. Given the hierarchical and longitudinal structure of the data, in these models, Student ID was incorporated as a random effect to account for repeated measures. Teacher ID captured the differences between teachers and was also integrated in the models as a random effect. Teacher stress (hypothesis 2) and teacher mindset (hypothesis 3) were included as fixed predictors on student performance. In each model, time was included as a fixed effect. However, these linear fixed-

effects models cannot assess the impact of these psychological constructs on student performance over a period of time (in this case, October to December). Hence, additional statistical evaluations were performed using linear mixed effects models with a fixed interaction term between stress and time (hypothesis 2) and mindset and time (hypothesis 3).

Prior to creating these linear fixed effects models, intraclass correlation coefficients (ICCs) were estimated to account for the variance across different levels in the dataset (teacher, student, and time levels). These ICCs analyses enabled the partitioning of the total variability in student performance into parts attributed to differences between teachers and differences between students. This model was utilized to justify the use of linear fixed effects models for the rest of the analyses.

An additional linear mixed-effects model was created to evaluate the role of the individual teachers in students' performance. It is important to note that this final analysis is not related to any hypothesis. Instead, this model aims to fill in potential gaps in the results from the previous statistical analysis. In addition, an estimated marginal means (EMMs) approach was implemented in RStudio (RStudio Team 2023) for a better interpretation of the results of this model. Finally, a model comparison was performed in order to assess the utilized models and how they perform in comparison with a null model. AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) were selected as information criteria for this evaluation.

3. Descriptive statistics

Before presenting the results of the statistical analysis, this chapter will provide an overview of the collected data in regard to teachers' stress and mindset and student performance in both testing sessions. The purpose of this section is to describe the key characteristics of the dataset and offer a preliminary understanding of the investigated variables. Descriptive statistics, including average and standard deviation (Std.) scores, will be presented and serve as the basis for the subsequent inferential statistical analysis in Chapter 4.

3.1. Teachers' stress levels

Teachers' stress levels were measured using a standardized questionnaire, as described in Section 2.3. The sample consisted of five teachers (n=5), and their scores are presented in Figure 2. below:

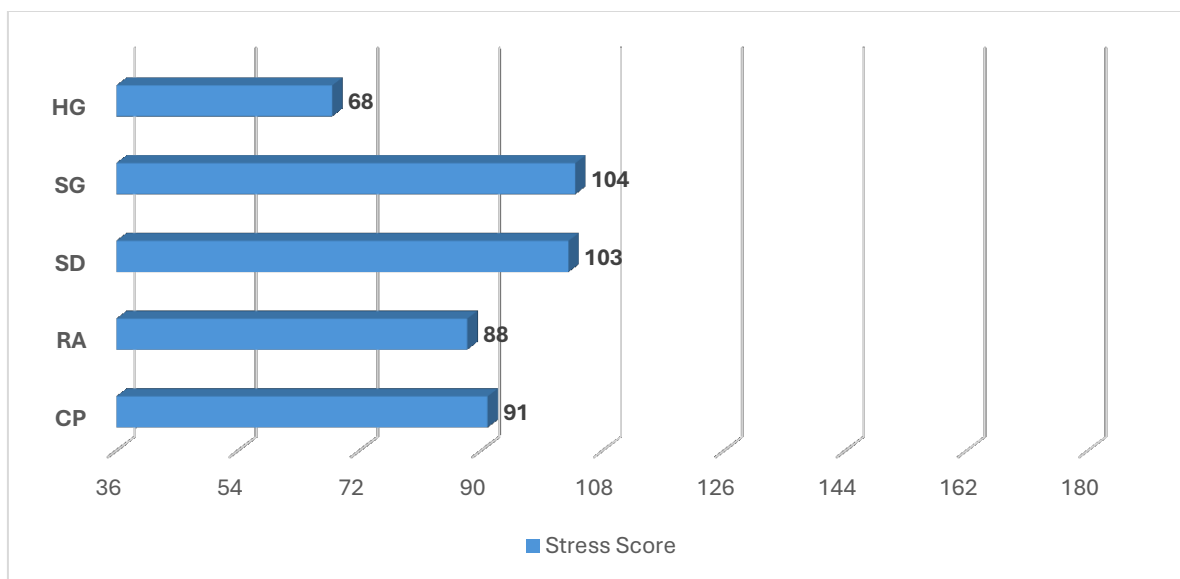


Figure 2. Overview of teachers' stress scores.

As indicated in the graph, teacher HG reported the lowest stress score, with 68 points out of 180. In contrast, the highest stress scores were observed in teachers SD and SG, with 103 and 104 points respectively. The rest of the teachers reported stress levels that fall between these extremes. This indicates a moderate variability across the teacher sample. This observation is further confirmed by the mean (average) score, which was 90.8 points (Std = 14.58). Still, due to the small sample size (n=5), these values should be interpreted with

caution. Moreover, given that the maximum score amounts to 180 points, the results suggest that the teacher sample exhibits moderate stress levels.

Overall, the results suggest relatively similar stress levels among all teachers, with HG being an outlier and showcasing notably lower stress levels compared to the rest of the sample.

3.2. Teachers' mindset scores

Teachers' mindsets were evaluated using a mindset questionnaire, as presented in Section 2.3. The mindset scores indicates whether the teacher has a growth (higher score) or a fixed (lower score) mindset. The teacher sample consisted of five teachers (n=5), and their mindset scores are presented in Figure 3. below.

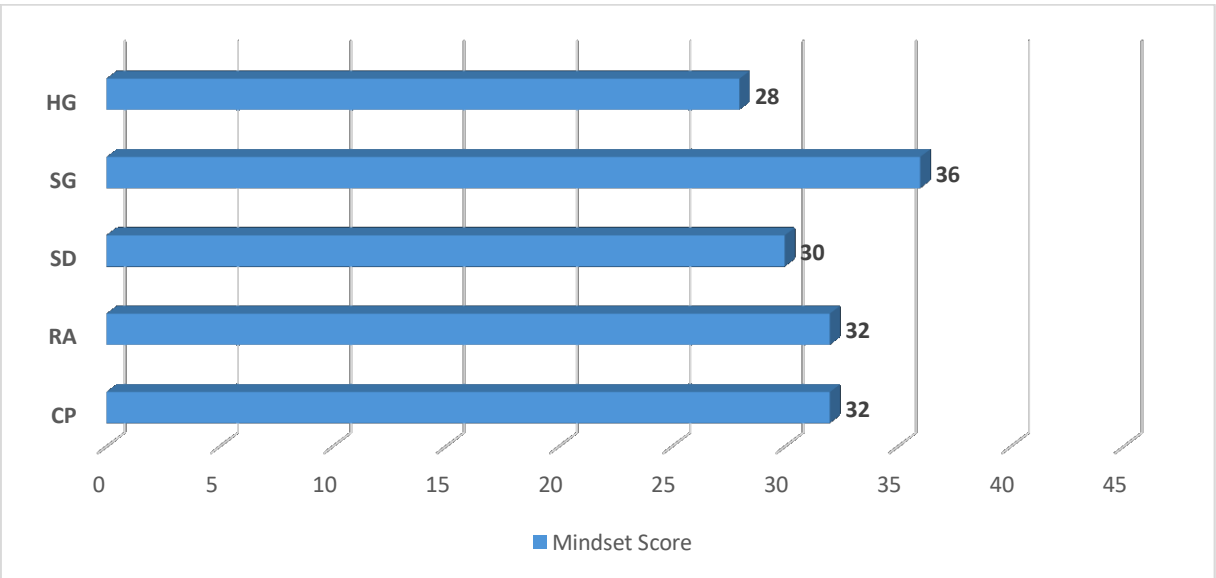


Figure 3. Overview of teachers' mindset scores.

As can be inferred from Figure 3., the highest mindset score was observed in teacher SG, with 36 points out of possible 45 points. Teacher HG reported the lowest mindset score, with 28 points. The results of the rest of the teacher sample fall between these minimum and maximum values. Moreover, the average mindset score was 31.6 points (Std = 2.97). These estimates indicate that the teacher sample exhibits moderate variability in their mindset scores. However, given the small sample size (n=5), these values should be interpreted with caution.

Additionally, having in mind the scoring system of the questionnaire (see Appendix 1), all teachers—with the exception of SG—fall into the category of “a growth mindset with some fixed ideas” (score range: 32-24 points). Teacher SG falls within the “strong growth mindset”

category (score range: 33-45 points). Still, SG's mindset score remain at the lower end of this category.

Overall, the results from the mindset questionnaire suggest relatively similar results across all teachers, with teacher SG standing out slightly in regard to the categorization of the scores.

3.3. Student performance

As outlined in Section 2.3., student performance was measured in two testing sessions, which took place in October and December 2023, using custom-made, curriculum-based tests. Since the tests contained a different number of questions—ranging from 15 to 25—students' final test scores were calculated in percentages to ensure comparability across sessions and teachers. Figure 4. presents the average test scores (as percentages) for each session, grouped by teacher.

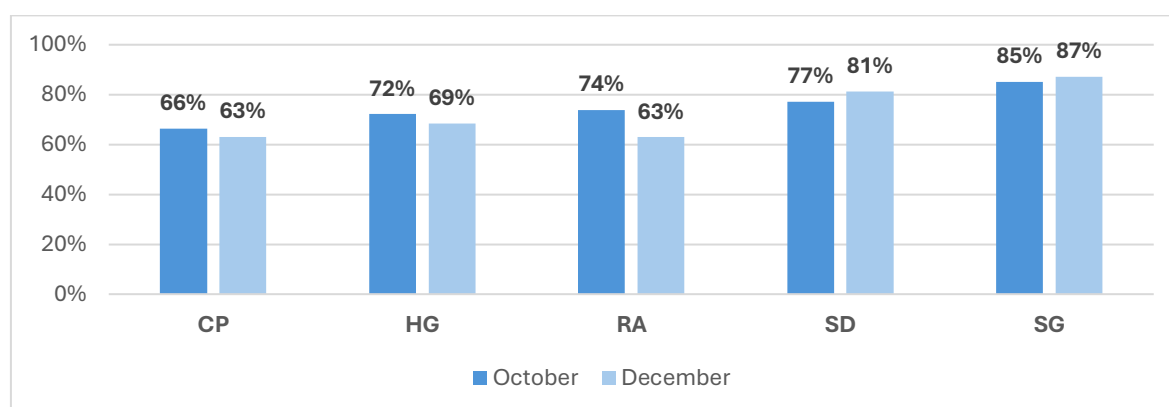


Figure 4. Overview of the average test scores (as percentages) from the October and December testing sessions, grouped by teacher.

As illustrated in Figure 4., students taught by teacher SG achieved the highest average test score in October, with 85% on average. The lowest average test scores were observed among the students of CP, with 66%. The remaining averages fall between these two values, suggesting moderate variability in student performance across teachers during the October testing session.

In December, SG's students again recorded the highest average test score, with 87%. The lowest average scores from the December testing session were observed among the students taught by teachers CP and RA, both achieving 63% average test scores. The students of teacher HG and SD have achieved average scores which lay between these extremes, again indicating moderate variability.

A comparison of October and December results shows no consistent pattern of improvement or decline. For example, the students of SD and SG have performed better during the December testing session, with average test score increases of 4% and 2%, respectively. In contrast, the average test scores of the students of teachers CP, HG, and RA have declined in December. The most substantial drop can be observed in RA's students, with an 11% decline in December. The average test scores of CP and HG experienced smaller declines of 3% each. A more detailed overview of the basic descriptive measures of the students' tests scores is presented in Table 2. below.

Teacher	October				December			
	Mean	Std	Min	Max	Mean	Std	Min	Max
CP	66%	22%	12%	100%	63%	25%	12%	100%
HG	72%	18%	32%	96%	69%	21%	9%	95%
RA	74%	15%	32%	100%	63%	19%	15%	95%
SD	77%	19%	28%	100%	81%	15%	44%	100%
SG	85%	16%	26%	100%	87%	14%	39%	100%

Table 2. Overview of basic descriptive measures of students' tests scores grouped by teacher.

As can be inferred from Table 2., the test scores of students taught by CP have the largest standard deviation in both testing sessions (Std October = 22% and Std December = 25%). In contrast, the lowest standard deviation in October can be observed in teacher RA with 15%; however, in the December session, teacher SG has the lowest standard deviation with 14 %. Moreover, in comparison to October, the standard deviation increases in December for some teachers, such as CP, HG, and RA, while for others it decreases (e.g. teachers SD and SG). Overall, there is no significant pattern of increase or decline in the standard deviation across all teachers.

According to Table 2., all teachers—except HG—had students who achieved the full score on the October tests. In December, no students taught by HG and RA reached the maximum possible score on the tests. In contrast, some students of teachers CP, SD, and SG also achieved perfect scores in December. Interestingly, the maximum score for teacher HG has slightly declined in December to 95% (from 96% in October). The minimal test scores vary across teachers and testing sessions. In October, the lowest minimum score can be observed for CP at 12% while HG and RA had the highest minimum scores, both at 32%. In December, however, the students taught by HG recorded the lowest minimum score at just 9%. The minimum test scores of CP and RA were similarly low, at 12% and 15%, respectively, and

closer to that of HG than those of SD and SG. The highest minimum score was observed for teacher SD, at nearly 50% (minimum score = 44%), while SG also recorded a relatively high minimum score of 39%. Despite these variations, there are no clear patterns in the fluctuations of minimal or maximum test scores across teachers and testing sessions.

Overall, the data offers a detailed overview of student performance; however, no consistent trends were identified.

4. Inferential statistics

Building on the descriptive statistics presented in the previous chapter (see Chapter 3) and the methodological framework outlined in section 2.4., this chapter presents the results of the inferential statistics' analyses which were performed to test the current study's hypotheses. Each subsection corresponds to one of the hypothesis outlined in section 1.3., allowing for a more focused and detailed exploration of the dataset. In addition, complementary analyses are included to provide a further insight into the data and support a more comprehensive interpretation of the findings. The results of these additional analyses are described in two additional subsection.

4.1. Hypothesis 1: Teachers' mindset and stress

According to Hypothesis 1, teachers with higher mindset scores would report lower stress levels. To test this hypothesis, Spearman's correlation was performed. The results are presented Table 3. below.

Shapiro-Wilk Test for Bivariate & Multivariate Normality		
Stress-Score - Mindset-Score	Shapiro-Wilk	p
	0.595	< 0.001
Spearman's Correlation		
Stress-Score - Mindset-Score	Spearman's rho	p
	0.702	< 0.001

Table 3. Summary of Shapiro–Wilk tests for normality and Spearman correlation results for teachers' mindset and stress.

As presented in the table above, the incorporated Shapiro-Wilk test for both multivariate normality ($W = 0.595$, $p < 0.001$) and bivariate normality ($W = 0.595$, $p < 0.001$) indicated that the data has a non-normal distribution. This is to be expected given the small sample size ($n=5$).

The correlation analysis revealed a strong positive correlation between teachers' mindset and stress scores ($p < 0.001$). These results indicate that higher stress levels are associated with a higher mindset score. These results reject Hypothesis 1. However, due to the limited sample size, the results from the Spearman's correlation should be interpreted with caution.

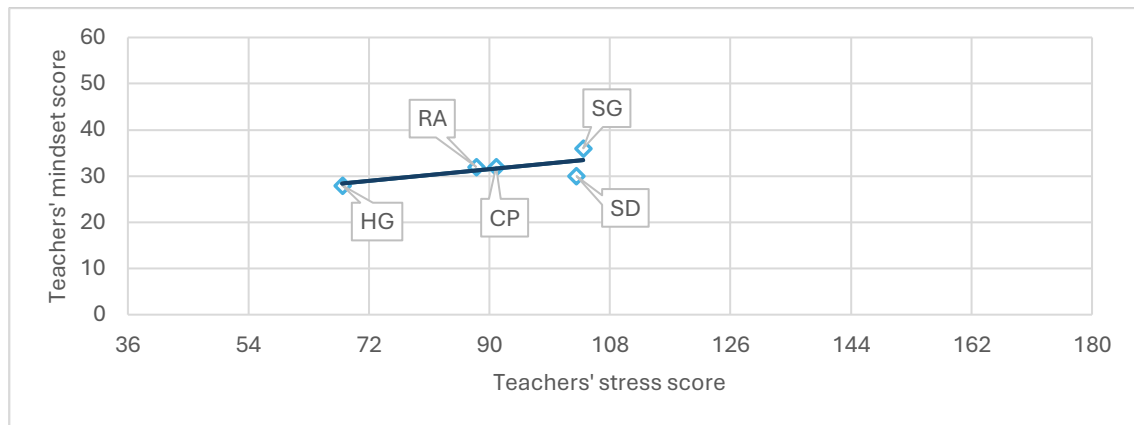


Figure 5. Trendline illustrating the relationship between teachers' mindset and stress scores.

A complementary descriptive analysis was also conducted to further investigate the data. Figure 5. confirms the initial results from the correlation analysis. As shown by the trendline in the graph, teachers who report higher stress levels tend to have higher growth mindset score. This observation rejects Hypothesis 1.

In conclusion, the conducted correlation and descriptive analyses reject Hypothesis 1 by indicating that higher stress levels are associated with higher mindset scores.

4.2. Preliminary analysis: ICCs

Prior to testing the remaining two hypotheses of the current study, the nested structure of the data was examined to justify the use of linear mixed-effects models. As described in section 2.3., student performance was measured repeatedly in two testing sessions. Moreover, in the dataset, students were nested within teachers. Having in mind this nested structure of the dataset, intraclass correlation coefficients (ICCs) were calculated to assess the variance that can be attributed to teachers and students. For this purpose, a null model was created, which includes Student ID, Teacher ID, and time as random effects, but does not have any fixed effects incorporated. The exact values of the ICC calculations are presented in Table 4.

ICCs	Values
ICC_Student	0.513772
ICC_Teacher	0.164975
ICC_Time	0.0079

Table 4. Intraclass Correlation Coefficients (ICCs) for teachers, students, and time.

As can be seen from the table above, the ICCs indicate that there is substantial variance at both student (51.4%) and teacher (16.5%) levels. These results justify the use of a linear

mixed effects models with random intercepts for students, indicated as Student ID in the dataset, and teachers, denoted by Teacher ID, for further analysis of the data. The ICC for time was also approximated; however, it remained relatively low (0.8%). This suggests that only a negligible part of the variance in the data can be attributed to time. Thus, time was incorporated as fixed effect in the model.

4.3. Hypothesis 2: Teachers' stress and student performance

The second hypothesis of the present study was related to the relationship between teachers' stress levels and their impact on student performance. To examine this relationship, linear mixed models were utilized to predict students' tests scores from their teachers' stress scores, while controlling for test time (October vs. December) and including random intercepts for students and teachers. The results, illustrated in Table 5. below, showed no significant effect of teacher stress on student performance.

Random effects		Var	Std	
Student		224.29	14.98	
Teacher		56.65	7.53	
Fixed effects		Estimate	t-value	p-value
Intercept		37.71	1.52	0.223
Time (October)		2.79795	2.891	0.00413 **
Teachers' stress		0.381	1.41	0.251

Table 5. Results of linear mixed effects model predicting student performance from teachers' stress levels across time.

As indicated in Table 5., random effects suggest substantial variance that can be attributed to students (Std = 14.98) and teachers (Std = 7.53). Fixed effects indicate that time has a significant effect for October ($p = 0.004$); however, teachers' stress levels were not significantly associated with student performance ($p = 0.251$), rejecting Hypothesis 2.

Random effects		Var	Std
Student		226.14	15.038
Teacher		56.64	7.526

Fixed effects	Estimate	t-value	p-value
Intercept	27.19	1.086	0.35
Time (October)	23.82	3.4	0.0008***
Stress Score	0.49	1.82	0.16
Time (October)*Stress Score	-0.23	-3.029	0.003**

Table 6. Results of linear mixed effects model evaluating the interaction effects between time and teachers' stress on student performance.

Additionally, in order to strengthen the analysis and go beyond the static effects of teacher stress on student performance, the interaction between time and stress was also investigated by fitting an additional linear mixed-effects model. The results, as presented in Table 6., reveal that time is a statistically significant fixed effect ($p = 0.0008$). More importantly, the interaction of time (October vs. December) and teachers' stress levels appears to be a statistically significant predictor of student performance ($p = 0.003$), indicating that in the current dataset, teachers' stress scores and the time between the two testing sessions were meaningfully associated with the learning outcomes of students. The significance of this parameter indicates that the effect of stress on student performance depends on time. The negative estimate (estimate = -0.23) suggests that higher stress levels have a deteriorating effect on students' test results. The main effect of stress remains insignificant in this additional model as well ($p = 0.16$). These results partially support Hypothesis 2.

Overall, the conducted analyses provided partial evidence supporting the second hypothesis that higher teacher stress impacts student performance negatively over time. On one hand, teacher stress alone is not meaningfully associated with student performance, rejecting the hypothesis. On the other hand, the analyses confirmed that the effects of teachers' stress levels on student learning outcomes depend on time. This aligns with the second hypothesis' assumption that teacher stress affects student performance negatively over time.

4.4. Hypothesis 3: Teachers' mindset and student performance

Hypothesis 3 examines the relationship between mindset and student performance. Similarly to the analysis for the second hypothesis, a linear mixed-effects model was fitted, predicting students' test scores from teachers' mindset scores, with random intercepts for teachers and students. Time was included as a fixed effect. The results are summarized in Table 7. below.

Random effects	Var	Std	
Student	224.28	14.976	
Teacher	70.84	8.416	
Fixed effects	Estimate	t-value	p-value
Intercept	24.8969	0.534	0.63007
Time (October)	2.7979	2.891	0.00413 **
Mindset Score	1.5004	1.022	0.38212

Table 7. Results of linear mixed effects model predicting student performance from teachers' mindset scores across time.

As illustrated in the table, random effects indicate similar variance as previous models. The effects of teacher mindset were found to be positive but did not have statistical significance ($p = 0.382$). The effect of time remained significant with higher test scores in October than in December ($p = 0.004$). These results reject hypothesis 3.

Similarly to the analysis for hypothesis 2, an additional linear mixed-effects model was fitted to examine the interaction effects of teachers' mindset and time on student performance. The results are presented in Table 8. below.

Random effects	Var	Std
Student	224.32	14.977
Teacher	70.84	8.416

Fixed effects	Estimate	t-value	p-value
Intercept	18.5877	0.396	0.718
Time (October)	15.4163	1.324	0.187
Teachers' mindset score	1.6982	1.148	0.332
Time (October)*Mindset Score	-0.3958	-1.087	0.278

Table 8. Results of linear mixed effects model evaluating the interaction effects between time and teachers' mindset on student performance.

The analysis revealed that the interaction effects of time (October vs. December) and teachers' mindset scores on student performance were positive but did not reach statistical significance ($p = 0.278$). Additionally, none of the other fixed effects—time and mindset—produced statistically significant results. More precisely, the effects of time were not a significant predictor of student performance ($p = 0.187$), which contradicts the results of the previous linear mixed-effects model. On the other hand, teachers' mindset score is found to have a positive yet statistically not significant association with student performance ($p = 0.332$). The results from this model reject hypothesis 3 as well.

Clearly, the conducted linear mixed-models analyses revealed no significant effect of mindset on student performance, providing no evidence to support hypothesis 2.

4.5. Complementary analysis: The teacher factor

The previous analyses evaluated the three hypotheses of the current study, focusing on the impact of specific teacher characteristics, such as stress levels and mindset, and their potential impact on student academic performance. As the results showed, these factors alone did not account for the variability observed in students' performance across the two

testing sessions. Given that teachers possess diverse characteristics beyond their stress levels and mindset, it is important to investigate the impact of teachers themselves on students' learning outcomes and whether students' progress varies across teachers over time.

To address these gaps, an additional linear mixed-effects model was fitted, which incorporated fixed effects for test time and teacher, interaction effects between time and teacher as well as random intercepts for students. The results are summarized in Table 9. below.

Random effects	Var	Std
Student	230.4	15.18

Fixed effects	Estimate	t-value	p-value
Intercept	62.98413	26.534	<0.0001***
Time (October)	3.42857	1.724	0.08579
Teacher HG	5.41972	1.535	0.12548
Teacher RA	-0.02958	-0.009	0.99289
Teacher SD	18.34921	4.99	<0.0001***
Teacher SG	24.09163	7.26	<0.0001***
Time (October)*Teacher HG	0.32143	0.109	0.91353
Time (October)*Teacher RA	7.49567	2.696	0.00743**
Time (October)*Teacher SD	-7.60635	-2.469	0.01414*
Time (October)*Teacher SG	-5.35281	-1.925	0.05519

Table 9. Results of the linear mixed-effects model including fixed effects for test time and teacher, their interaction, and random intercepts for students.

The analysis revealed that the main effect of time was positive but not statistically significant ($p = 0.086$), indicating a trend towards higher test scores in October. In addition, two of the other main effects for teachers were statistically significant. For example, the performance of students was positively linked with teachers SD ($p < 0.0001$) and SG ($p < 0.0001$), suggesting that students of these teachers were scoring better than students of CP⁴. This in turn points out that personal teachers' characteristics may hold explanatory power for students' performance. Nevertheless, results were dubious for other teachers, such as RA ($p = 0.99$) and HG ($p = 0.13$) where no statistical significance was identified. These results

⁴In RStudio, when using a factor variable (like Teacher ID in this case) in a model, the first level of the factor alphabetically is automatically chosen as the reference category by default. In the case of the current study, teacher CP comes first alphabetically (e.g. CP, HG, RA, SD, SG). Thus, this teacher is selected as the reference level.

suggest that the mean student test scores did not differ meaningfully between the reference teacher and all other teachers.

In addition, the model showed statistically significant interactions between specific teachers and test time. For example, the interaction between teacher RA and time was significant ($p = 0.007$), which indicates that students taught by RA showed significant decline between the two testing sessions in comparison to the reference teacher CP. Similarly, the interaction between time and teacher SD was found to be statistically significant ($p = 0.014$). However, the negative coefficient (-7.61) indicates that the interaction is negative, hinting at a potential trend towards improvement in the test scores of the students of teacher SD across the testing sessions. Similar negative interaction can be observed for teacher SG; however, the interaction between time and teacher SG did not reach statistical significance ($p = 0.055$).

These analysis examined the interaction effects between test time and teacher and showed that students of different teachers varied in their progress between the two testing sessions. However, this model does not provide any further explanations on which teachers significantly differ from each other at specific time points.

Thus, the estimated marginal means (EMMs) approach implemented in RStudio (RStudio Team 2023) was employed to interpret the results of the linear mixed-effects model. This tool allowed for pairwise comparisons of teacher effects within each time point, adjusting for other factors included in the model. Summary of the results is presented in Table 10. below:

Teacher comparison pairs	October		December	
	Estimate	p-value	Estimate	p-value
CP - HG	-5.7411	0.4813	-5.4197	0.5401
CP - RA	-7.4661	0.1638	0.0296	1
CP - SD	-10.7429	0.0301	-18.3492	<0.0001***
CP - SG	-18.7388	<0.0001***	-24.0916	<0.0001***
HG - RA	-1.7249	0.9879	5.4493	0.5242
HG - SD	-5.0017	0.689	-12.9295	0.0073**
HG - SG	-12.9977	0.0021**	-18.6719	<0.0001***
RA - SD	-3.2768	0.8969	-18.3788	<0.0001***
RA - SG	-11.2727	0.0058**	-24.1212	<0.0001***
SD - SG	-7.996	0.1835	-5.7424	0.5133

Table 10. Results of pairwise comparisons of estimated marginal means between teachers within each time point (October and December), based on the linear mixed-effects model.

As can be seen from the table, the conducted pairwise comparisons revealed several significant differences between specific teacher pairs in the dataset. Taking a closer look at the results from October, it becomes clear that teacher SG outperformed the other four teachers. In contrast, CP has the lowest adjusted student performance scores among all teachers. However, only three of the pairwise comparisons reached statistically significant values, indicating meaningful differences between the pairs of CP – SG ($p < 0.0001$), HG – SG ($p = 0.002$), and RA – SG ($p = 0.006$).

In December, the trends from October remained largely consistent. Teacher SG remained as the highest-performing teacher. The results indicate that the differences between CP – SG ($p < 0.0001$), HG – SG ($p < 0.0001$), and RA – SG ($p < 0.0001$) are statistically significant. Only the comparison SD – SG ($p = 0.51$) was not statistically significant. Moreover, similarly to October, CP had the lowest estimated marginal means among all teachers. In December, however, RA and CP achieved equal estimated marginal means ($p = 1$). The comparisons between CP – SD ($p < 0.0001$) and CP – SG ($p < 0.0001$) were statistically significant, indicating meaningful differences in the estimated marginal means. Teacher SD also significantly outperformed RA ($p < 0.0001$), and HG ($p = 0.0073$).

The pairwise comparisons of estimated marginal means across all teachers highlighted certain patterns in the dataset. For instance, teacher SG consistently outperformed her colleagues at both time points, while teachers CP and RA tended to perform worse. The results also revealed that between October and December, for some teachers, their students' tests scores improved (SG and SD), while others experienced decline in their students' performance (e.g. CP and HG).

Clearly, the estimations presented above statistically show that characteristics beyond mindset and stress levels have a considerable impact on student performance. Nevertheless, it remains unclear which model provides the most reliable and conclusive results for the factors that influence student performance. To shed further light on this, a model comparison was performed, aiming to evaluate the efficacy of all models utilized in this research in comparison to the null model⁵. This procedure also evaluates if the random effects were correctly chosen and indeed enhance model performance. For this purpose, AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) were utilized to assess and

⁵ This null or baseline model does not include any predictors, such as mindset, stress, or teacher.

compare the relative fit of the statistical models. Table 11. below presents the results from the model comparison:

Model	AIC	BIC
Model Null	4974.3	4996.2
Model Mindset	4967.8	4993.99
Model Stress	4970.3	4996.5
Simple Linear Model Mindset	5165.9	5183.4
Simple Linear Model Stress	5156.8	5174.2
Interaction Effects – Time & Mindset	4968.8	4999.4
Interaction Effects – Time & Stress	4966.6	4997.2
Interaction Effects – Time & Teacher	4907.1	4959.5

Table 11. Results of model comparison using Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC).

As shown in Table 11., the null model has the highest AIC (4974.3) value among all linear mixed effects models, suggesting that it has the poorest fit and thus, the smallest explanatory power. Only simple linear models have higher AIC values. The high values of the information criteria for the null model also imply that there are certain factors that influence student performance. In this regard, the results show that both models for main effects of stress and mindset led to modest reductions in the AIC values, indicating a slight improvement of model fit compared to the null model. However, including interaction effects resulted in improvement in the model fit only for stress (4966.6). Moreover, the model incorporating the main effect of mindset had the third-lowest AIC value (4967.8), suggesting that mindset still contributes meaningful explanatory value to the model⁶. Most notably, the model including interactions between time and teacher yielded the lowest AIC (4907.1), indicating the best fit among all the assessed models. This implies that incorporating individual differences between teachers over time significantly improves the explanatory power of the model compared to other models that include psychological or contextual variables.

Despite being more useful for larger datasets, the BIC metric of the interaction effects of time and teacher model (4959.5) was also the lowest, suggesting the model's supremacy over the other models. Interestingly, the second lowest BIC (4993.9) was achieved by the mindset main effect model, which hints at the significance of this psychological construct to

⁶ This finding will be discussed in more detail in Chapter 5 in the context of Hypothesis 3, rather than in relation to these additional analyses.

student learning outcomes. Similarly to the aforementioned AIC values, all fitted linear mixed-effects models show better BIC metrics compared to simple linear models for stress and mindset, advocating for the choice of such models for analyzing the dataset.

Overall, the findings of these additional statistical analyses highlight the crucial role of other teachers' characteristics beyond stress and mindset that shape student academic performance. The implications of these findings will be discussed in greater detail in Chapter 5.

5. Discussion

The present study investigated the interaction between teachers' psychological factors—specifically stress and mindset—and their impact on student academic performance over time. These research objectives were addressed through three hypotheses (see Section 1.3.).

The first hypothesis proposed that teachers with higher mindset score would experience lower stress levels. Contrary to this expectation, the correlation analysis and descriptive statistics revealed a strong positive correlation between mindset and stress. This suggests that teachers with a growth mindset tend to report higher stress levels.

According to the second hypothesis, higher teacher stress levels were expected to negatively affect students' academic outcomes. This assumption was partially supported by the results. The linear mixed-effects model with stress as a main effect revealed no significant association between student performance and teachers' stress levels. Time was identified as the only significant predictor of students' test scores. An additional interaction model, however, revealed a significant association between teachers' stress levels and their students' performance over time. Similarly to the initially fitted main effect model, time was a significant predictor while stress remained insignificant.

The third hypothesis posited that students taught by teachers with a growth mindset will achieve higher test scores. While the results showed a positive—albeit non-significant—relationship between teacher mindset and student performance, model comparisons indicated that including mindset improved model fit (in comparison to the null model). This suggests that mindset may hold some explanatory value, even if the evidence was not strong enough to support the hypothesis conclusively. Moreover, additional analysis showed positive but not significant interaction effects between time and teachers' mindset in their effects on student performance over time.

Complementary analyses were conducted to further explore the differences in student test scores across individual teachers. These analyses revealed significant variability in both baseline test scores and student progress over time, with students of some teachers showing notably greater improvement or decline in their performance. These findings imply that teachers' characteristics beyond mindset and stress may substantially impact student academic outcomes.

Finally, a model comparisons based on AIC and BIC values indicated that the model including interactions between time and teacher provided the best fit, underscoring the necessity of considering a broader range of teacher-related variables in educational research.

The following discussion aims to contextualize these findings within the wider academic literature, offering a more nuanced interpretation in the light of existing research.

5.1. Stressed yet growth-mindset-oriented

The present study identified a positive correlation between teachers' mindset and their stress levels—an outcome that was somewhat unexpected having in mind the existing body of research. Previous studies have consistently shown that endorsing a growth mindset can help individuals overcome challenges and deal with occupational stress more effectively (Blackwell, Trzesniewski & Dweck 2007). Moreover, a growing body of research has found that the growth mindset framework could be successfully applied as an intervention. Such interventions have yielded promising results in various contexts, such as professional development (Johnston 2017) and among university students from various educational backgrounds (Lewis, Williams & Dawson 2020, Calo, Judd & Peiris 2024). Growth mindset interventions have been shown to improve resilience in the face of challenges (Calo, Judd & Peiris 2024) and increase job satisfaction despite high stress levels (Kondratowicz & Godlewska-Werner 2022). Growth mindset interventions have been also widely applied to teaching professional, showing promising results in terms of job satisfaction, engagement, (Frondozo et al. 2022, Nalipay et al. 2022) as well as classroom and emotional management (Rissanen et al. 2021). Furthermore, growth-mindset-oriented teachers have been found to be more likely to apply adaptive coping strategies and thus, exhibit enhanced resistance to setbacks or hardship and improved efficiency at their job compared to their colleagues who endorse a fixed mindset (Fives & Buehl 2016). The therapeutic potential of this type of interventions have also been established in regard to patients struggling with stress and depression (Miu & Yeager 2015, Yeager, Lee & Jamieson 2016, Schleider & Weisz 2016), which alludes to the benefits a growth mindset could bring to an individual who possesses it, especially in regard to their mental (and physical) health.

Given these prior findings linking growth mindset and improved overall well-being, the question of why the teacher sample in the present study demonstrated a positive correlation between mindset and stress levels becomes inevitable. To address this question and gain

more insight into the findings of the current study, a more detailed examination of the results from the stress and mindset questionnaires is warranted.

5.1.1. A closer look: Interpreting mindset scores

As described in section 2.3., the mindset questionnaire consists of statements related to the two mindsets—growth and fixed—and it has the following pointing scheme: A score between 45 and 33 points indicates a strong growth mindset. If the score falls between 32 and 24 points, it suggests a growth mindset with some fixed-mindset ideas. Scores between 23 and 15 points reflect a fixed mindset with some growth-mindset-oriented ideas, while a score between 14 and 0 points indicates a strong fixed mindset (see Appendix 1). As discussed in section 3.2., only one teacher (SD) falls into the category of strong growth mindset (mindset score = 36); however, her score lies on the lower side of the strong-growth-mindset spectrum. All the other four participants lean towards a rather mixed mindset where the growth-mindset orientation is more dominant, but the individuals still exhibit certain fixed-mindset beliefs. Their mindset scores are between 28-32 points. As already mentioned, the questionnaire contains statements for each mindset, and the participants must agree or disagree with these statements on a Likert scale. Figure 6. below aims to illustrate the score of each participant on the questions related to each mindset. To ensure comparability between the two sets of questions, which contain different number of items, the results are presented as percentages.

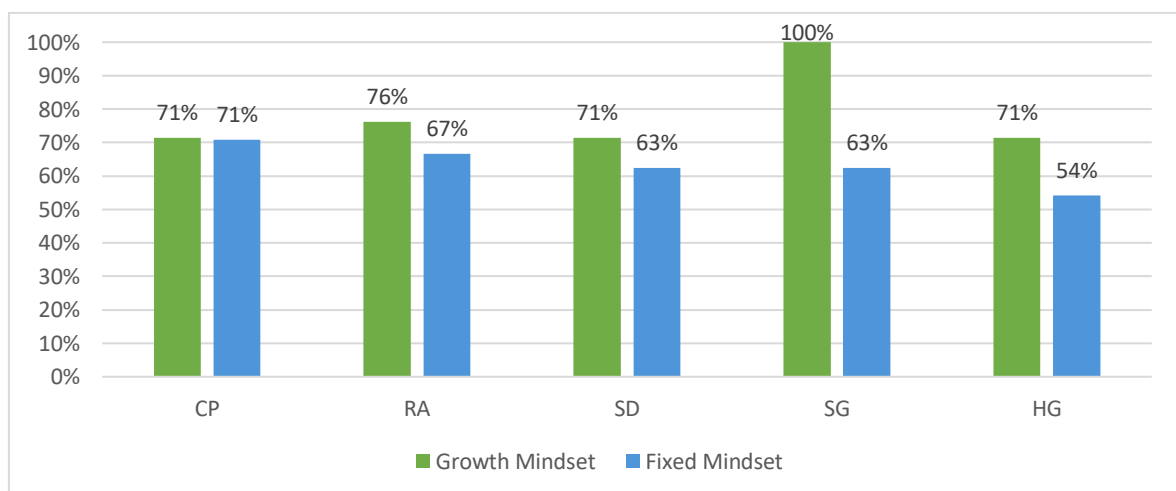


Figure 6. Overview of individual teachers' scores (%) on growth- and fixed-mindset questionnaire items.

Taking a closer look at Figure 6. reveals that only teacher SD has a significantly higher score on the growth-mindset-related questions. In fact, she has the maximum number of points for the growth-mindset-related questions. The rest of the participants have relatively similar

scores on both sets of questions, ranging between 71% and 76%. In regard to the fixed-mindset-oriented questionnaire items, teachers demonstrate relatively similar scores. HG has the lowest score of 54% while CP has the highest with 71%. Interestingly, CP has scored equally on both sets of questions, which could be interpreted as a mixed mindset—one that incorporates a balanced mix of growth- and fixed-mindset-oriented beliefs. The rest of the participating teachers scored lower on fixed-mindset questions than the growth-mindset ones. These results suggest that the participating teachers might lean towards the growth-mindset-end of the spectrum but still possess some fixed mindset beliefs, which in turn could potentially interfere with the final results.

Nevertheless, it is also possible that the teachers may have responded to the mindset questionnaire not based on their personal beliefs. Presumably teachers might have been influenced by internalized values acquired through their professional training and teaching experience. As Jacovidis and colleagues (Jacovidis, Anderson, Beach & Chadwick 2020: 4) point out, growth mindset has become a widely accepted educational principle in teacher education. For instance, beliefs about the malleable nature of one's ability is intrinsic to both the teaching profession and the growth mindset. Thus, the generally higher scores on the growth-mindset-oriented questions could signal that such beliefs reflect teachers' professional principles rather than their intrinsic beliefs about one's abilities and intelligence.

Moreover, the results from the mindset questionnaire might have been skewed due to social desirability bias, as participants might have responded in ways they believe are more favorable and acceptable rather than in ways reflecting their true beliefs. Given the convenience sample of the current study, this concern deserves serious consideration. Due to my personal connections with some of the teachers, they might have (unconsciously even) opted for answers that conform to socially desirable norms—a phenomenon that has been well-researched in educational setting (Crowbe & Marlowe 1960). The complexity of the matter is increased by the fact that teachers' espoused and enacted beliefs often blend together and thus, it is hard for an individual to differentiate between their epistemological beliefs about knowledge and how it is acquired, their self-efficacy beliefs about their teaching capacities, and their pedagogical knowledge on how to effectively teach (Hoy, Davis & Pape 2006). These constructs work together and influence teaching practices in the classroom—most often than not, unconsciously. This lack of awareness results in a discrepancy between teachers' beliefs and their actual practices in the classroom (Hoy, Davis & Pape 2006). Interestingly, while this is a well-known phenomenon in educational setting,

such discrepancies are difficult to measure in a reliable manner due to their interconnected and contextually contingent nature (Hoy, Davis & Pape 2006).

In effect, the teachers of the current sample may exhibit “false growth mindsets” that do not reflect their genuine beliefs but are potentially influenced by their teaching competencies and self-representation bias. This in turn could limit the extent to which their mindset scores represent the relationship between stress and mindset.

5.1.2. A closer look: Examining teachers’ stress scores

As described in section 2.3., teachers’ stress levels were also measured using a questionnaire with a possible total of points ranging between 36 and 180 points. The questionnaire was divided into 9 different aspects related to the teaching profession which could potentially be sources of stress. Figure 7. illustrates the variation in total stress scores as well as the distribution of specific stress-related aspects among the five participating teachers.

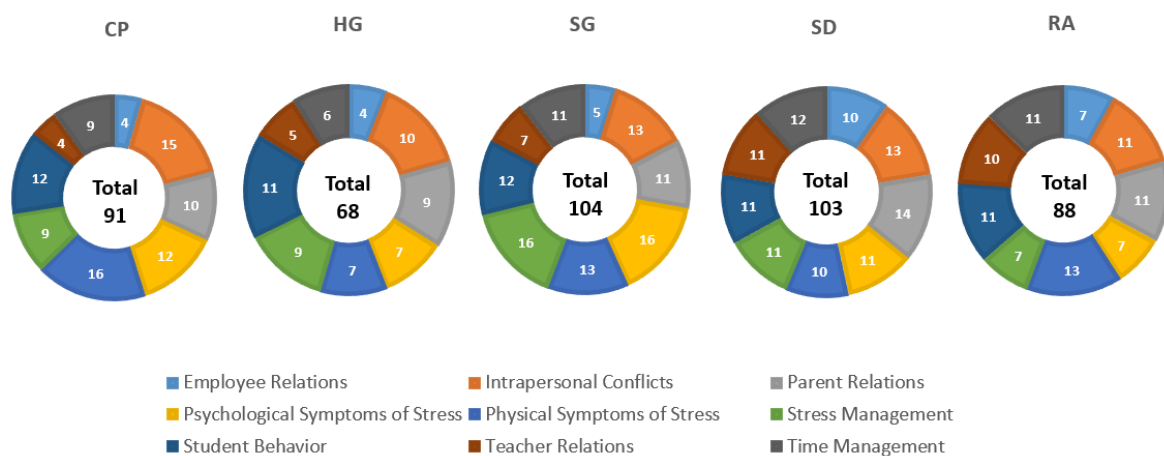


Figure 7. Variation in total stress scores and distribution of stress-related aspects among the five participating teachers.

As can be inferred from the graph above, the five participants in the current study exhibit stress levels between 68 and 104 which could be considered mid- to low-range stress levels. Psychological Symptoms of Stress (yellow), Parent Relations (grey), and Intrapersonal conflicts (orange) appear to be among the most prominent stressors across all five teachers. These similarities could be related to the fact that all five teachers work at the same school and presumably experience the same school model. Indeed, sources of stress may be similar on a national level since teachers work within the same educational policies, school models, and societal attitudes in relation to their profession and education in general (Kyriacou 2001). As research has already established, however, teachers might experience different

levels of stress when working in the very same conditions (Herman, Reinke & Eddy 2020). Similar conclusions can be drawn when looking at the data of the current study. Notably, SD and SG have the highest stress scores, though the sources differ. SG reports stress managements and regulating mental symptoms of stress as the most significant stress categories, whereas SD shows a broader distribution. In contrast, HG shows the lowest stress score with the smallest contributions for each category among all participants. These patterns underscore the strongly individual perception of (occupational) stress, which align with the established notion that it is individual characteristics of teachers that play a key part in one's perception of a situation as stressful or not (Rosenberg 2010). Despite the small number of participants, it becomes clear that these teachers are a group with diverse profiles. This presumably pertains to their skills, personality, values, and social environment (Kyriacou 2001). Other aspects include stress profiles (Bidi et al. 2024) and own perceptions of ability for coping with stress (Vandenberghe & Huberman 1999). Unfortunately, due to the limited scope of this master thesis, such aspects were not measured or taken into consideration.

Moreover, the sample of the current study consists entirely of foreign language teachers. As discussed in Section 1.2., the teaching profession combines organizational and emotional aspects, making it inherently demanding (Vandenberghe & Huberman 1999). However, some researchers claim that foreign language teachers have to deal with additional, unique to their field stressors (Piechurska-Kuciel 2011). These unique stressors, however, were not taken into account in the present study. The stress questionnaire employed for the data collection procedure is specifically created for teachers and thus does not include any additional aspects related to the language teaching profession that could also be regarded as stress-inducing. As a result, this omission of language-teaching-specific stressors may impose certain limitations and potentially lead to an underestimation of the true stress levels that the teachers experience. It should also be pointed out that this potential underestimation may have been further impacted by social desirability bias due to my personal connections with the participating teachers. Presumably, participants might have withheld full honesty in their responses on the stress questionnaire due to fears of appearing unprofessional or disclosing personal information. Ultimately, these concerns reflect one of the inherent limitations of self-report instruments—it is impossible to ensure the complete honesty of participants. Nevertheless, despite these limitations (a more detailed discussion of the study's limitations can be found in section 5.5.), the collected data still provides a valuable account of teachers' perceptions of stress and mindset. Moreover, the data offers a meaningful starting point for

a better understanding of the relationship between mindset and stress in an educational setting. Indeed, examining the collected data did reveal certain trends among the participants related to stress and mindset; however, a more in-depth analysis is necessary to better understand the link between these two psychological constructs.

5.1.3. Connecting the dots: Teachers' stress and mindset

The findings of the current study suggest that individuals with a growth mindset may experience exacerbated levels of stress. This contradicts the established notion that growth-mindset beliefs could be beneficial when coping with negative emotions and experiences. In this regard, one should keep in mind that mindsets are a set of beliefs (Dweck 2006). However, these individual beliefs are not isolated but work together to form a bigger meaning-making system (Hecht, Yeager, Dweck & Murphy 2021), which in turn organizes reality by influencing how an individual perceives themselves and their environment (Hildrew 2018). In fact, growth mindset has been found to correlate positively with perfectionists tendencies and high personal standards (Mofield & Peters 2018). A study among students in Greece found a positive association between growth mindset and attitudes for higher achievement as well as setting high personal standards and striving for excellence (Mofield & Peters 2018). Similarly, a neurological study found that individuals endorsing a growth mindset showcase an increased error-related attention, which means that such individuals are more likely to pay close attention to their mistakes (Moser et al. 2011). Moreover, research among teachers has also shown that growth mindset is linked to critically reflective behavior (Burnette et al. 2020). Undoubtedly, continuous self-monitoring for mistakes and perfectionist tendencies could increase teachers' stress levels, despite—or because of—their growth mindset. As can be expected, the combination of growth mindset and constantly seeking perfection in one's work may exacerbate overworking tendencies and create internal pressure even outside of work (Mofield & Peters 2018). In the context of the current research, it is possible that teachers who exhibit high mindset scores and high stress scores could struggle with their personal standards, and their growth mindset beliefs might compel them to strive for perfection in their work. High perfectionism is, however, often accompanying young, less experienced teachers (Stoeber & Rennert 2008; Flett & Hewitt 2002), which is not the case for the sample of the current study. All participating teachers claimed to have over 20 years of experience in the teaching profession. Having such considerable experience, teachers often develop more realistic standards of their work with

students as well as more effective coping strategies and thus are less likely to experience the negative effects, such as stress, of their perfectionism over time.

Still, experience alone does not fully account for variations of stress levels among teachers—generational traits and broader socio-economic factors must also be considered. This perspective was investigated in a study on the generational differences in teachers' motivation and professional competencies (Mikušková 2023). The researchers found out that Generation X teachers—typically born between 1965–1980—are knowledge-driven professionals who are also emotionally engaged with their students and put a considerable value into the interpersonal and socio-emotional aspects of their profession (Mikušková 2023: 37). Especially in Eastern Europe, this generation of teachers have retained quite a few elements of more traditional classroom practices, such as firmness, high academic expectations, and stricter classroom structure (Mikušková 2023). In the context of the current research, based on their age, all participating teachers could be classified as belonging to Generation X. Thus, it would be fair to claim that they are likely to exhibit the aforementioned tendencies, which in turn could lead to increased stress levels.

Simultaneously, older, more experienced teachers internationally report a decline in student behavior and parental involvement (Sørensen, Lagestad & Mikalsen 2023). Moreover, teachers see a worrying trend of egocentric behavior among students as well as permissive parenting behavior (Sørensen, Lagestad & Mikalsen 2023). Interestingly, both of these aspects—student behavior and parents relations—are among the most prominent stressors reported by the five participants in the current study (see Figure 7.). Even more intriguing is the fact that one would assume that such experienced teachers should have mastered dealing with problematic students or intrusive parents. Yet the results of the current study indicate that even after over two decades in the classroom, teachers are experiencing difficulties. These challenges, however, are more likely to be related not so much to personal deficiencies, such as lack of competencies to deal with them. Instead, the results signal a widely recognized trend—that of problematic behavior of students and their parents (Little 2005, Granger et al. 2025, Lasater 2016)

Furthermore, the positive correlation between stress and mindset found in the current study could be explained by the fact that mindsets can be domain-specific, meaning that an individual may hold fixed-mindset beliefs in one area and a growth mindset in another (Dweck 2006). This tendency is explained in the following quote:

Individuals can vary along a continuum from fixed mindsets (beliefs that human attributes are relatively stable) to growth mindsets (beliefs that human attributes can be developed). Individuals can hold different mindsets across a range of attributes and abilities. For example, an individual may believe that their weight is relatively stable but that their intelligence can be changed. (Burnette et al. 2020: 2)

Evidently, a mindset can be regarded as a continuum or a spectrum—a person does not exclusively have either fixed or growth mindset. Instead, individuals tend to lean towards one end of the mindset spectrum, hinting at the fluid nature of mindset beliefs. Furthermore, this conceptualization allows for the existence of hybrid or mixed mindsets—which happens to be the case for most teacher participants in the present study. Moreover, an individual might have different mindset in different domain of their life, as pointed out by Burnette and colleagues (Burnette et al. 2020: 2). Having this in mind, it is possible that a teacher might have a growth mindset in the classroom, but they may hold fixed-mindset beliefs in the domain of their emotions and thus, higher stress levels might trigger thoughts, such as “I’ll always feel this way,” which in turn could lead to burnout. On the contrary, teachers with growth mindset in the domain of emotions may employ better coping strategies in stressful situations even if they hold fixed-mindset beliefs in the classroom.

Besides mindset in the domain of emotions, other mindset-related tendencies may interfere with one’s perception of stress. In fact, measuring stress does not necessarily capture objective demand, but reflects individual’s cognitive evaluation. Moreover, one’s mindset can influence how they view stressful or difficult situations. Growth-mindset-oriented individuals tend to regard arising difficulties as challenges, and the process of overcoming them offers new opportunities to learn and grow (Dweck 2006). People endorsing fixed mindset, on the other hand, are more likely to view such situations as hindrances and may even perceive them as treats to their image (Dweck 2006). In this context, mindset could also influence one’s responses on a questionnaire or a survey. As Burnette and colleagues’ meta-analysis showed (Burnette et al. 2020), individuals with growth mindset are more likely to engage in deeper metacognitive reflection, which in turn could result in a more authentic and nuanced self-disclosure of their emotions. Thus, people endorsing the growth mindset are found to be more likely to report accurately and consciously when participating in stress surveys. Given this observation, the hybrid mindsets of the participating teachers may reflect their distorted perceptions of stress. Their biased perceptions may have subsequently influenced their responses on the stress questionnaire and ultimately affecting the findings.

Overall, these results offer an interesting, new perspective on the association between growth mindset and stress, challenging the existing understanding. Furthermore, contextualizing the results into the existing body of literature revealed that other factors—such as years of experience, generation, perfectionistic tendencies, etc.—could be closely intertwined with one’s mindset and their perception of stress. Concerns about the authenticity and reliability of the collected data underscored the importance of alternative methods for data collection. This aligns with the view that teachers’ knowledge and beliefs are deeply intertwined, dynamic, and context-dependent, which in turn necessitates the application of a blend of quantitative and qualitative methods (Hoy, Hoy & Davis 2006).

5.2. Frazzled teachers, functioning students

The analyses pertaining to the second hypothesis (see Section 4.3.) yielded mixed results. On one hand, the linear mixed-effects model analysis with stress as main effect revealed no significant effect of teacher stress on student performance. These results rejected the second hypothesis of the current study. This finding also refutes existing theories of emotional contagion (Hatfield, Cacioppo & Rapson 1994) and other prior research on the negative effects of stress on students (Jögi, Pakarinen & Lerkkanen 2023, Wong, Ruble, Yu & McGrew 2017). Still, the interaction effects model revealed that teacher stress levels are negatively associated with student learning outcomes across time, indicating that the effect of stress on student performance depends on time. This finding provides partial support for the second hypothesis.

The school classroom is one of the places where young people spend most of their time growing up—some experts’ estimates reach 15,000 hours in total (Oberle & Schonert-Reichl 2016). Moreover, the existing body of literature provides solid evidence for the strong link between the classroom environments and students’ success and well-being (Eccles & Roeser 2013, Jennings & Greenberg 2009, Dimitropoulou et al. 2025). Undoubtedly, teachers play a key role in establishing a positive classroom environment (Jennings & Greenberg 2009), which is why investigating teacher stress is of utmost importance.

The existing body of research has identified a number of repercussions which stem from teacher stress and affect students’ learning outcomes as well as their mental and physical health. For instance, a study investigating the biological responses of students of stressed teachers showed that students’ cortisol levels were increased (Oberle & Schonert-Reichl 2016). Stressed teachers are also less likely to be emotionally invested in their lessons, which

is crucial aspect to the efficacy of teaching and students' mental health (Jennings & Greenberg 2009). In addition, teachers experiencing high stress levels have to deal with feelings of impatience, frustration, and irritability—alongside preparing and conducting their lessons (Poon et al. 2019). This, understandably, can be mentally draining, further deteriorating one's mental health. Long-term distress among teachers is also positively associated with decreased quality of instruction, which in turn could result in decline in student engagement (Pas, Bradshaw & Hersfeldt 2012). Moreover, when put continuously under stress, teachers tend to utilize punitive and reactive classroom management strategies (Oberle & Schonert-Reichl 2016: 31). This lack of responsiveness in stressed teachers, in turn, is unlikely to provide a supportive and encouraging environment for students to thrive in (Goodenow 1993). Particularly, such an unfavorable classroom climate may exasperate problematic student behavior and make students feel as if their needs does not matter (Oberle & Schonert-Reichl 2016), creating a vicious cycle of stressful experiences for both students and teachers. In this context, the findings of the current study provide a new perspective on teacher stress.

A considerable body of literature provides empirical evidence for this link. Yet the results of the current study are contradictory, showing that the negative effects of teacher stress are only significant across time. Teacher stress as a main effect alone does not appear to be meaningfully associated with student performance. A plausible explanation for these rather contradicting findings could be the fact that the students from the current sample don't spend a considerable amount of time with their English language teachers for their stress levels to affect them considerably. Table 12. presents an overview of the number of lessons per week according to the national policy for the minimum of required foreign language lessons from 2023 (Ministry of Education and Science of the Republic of Bulgaria 2023). This is the policy that is currently applied in the Bulgarian educational system.

Grade	Annual Hours	Number of Weeks	Lessons per Week
3	96	32	3
4	102	32	~3.2 → typically 3
5	102	32	~3 lessons
6	102	32	~3 lessons

Table 12. Overview of the foreign language instruction hours in Bulgarian schools by grade level.

As can be seen, there must be at least 3 English lessons per week from grade 3-6—the grades from which the student sample of the current study consists. Each lesson lasts roughly 40

minutes, meaning that students spend 2 hours with their foreign language teachers per week—an amount of time which presumably is not enough to observe any tangible, direct effects of teacher stress on students.

By contrast, the results of the interaction model revealed that the impact of teacher stress changes over time. And while stress alone does not consistently predict student learning outcomes, its effect appeared to depend on the testing session. This may indicate that teacher stress accumulates over time or that its effects become more pronounced under certain conditions. This perspective aligns with previous research that underscores the dynamic relationship between teacher stress and students' academic performance (Jögi, Pakarinen & Lerkkanen 2023, Cece, Guillet-Descas & Lentillon-Kaestner 2022). These studies point out the temporal dynamics associated with teacher stress—that stress evolves over the academic year and consequently, its effects change over time. For instance, a longitudinal study measured teacher burnout and vigor across three points in time—fall (October/November), winter (Jan/Feb), and late spring (May/June)—revealing patterns of fluctuations and accumulation (Cece, Guillet-Descas & Lentillon-Kaestner 2022). These cumulative trends of teacher stress were found to have a negative effect on students, resulting in intensified internalizing and externalizing symptoms among students of distressed teachers (De Rubeis et al. 2024). Moreover, the study of De Rubeis and colleagues highlights the context-dependent nature of teacher stress by identifying factors related to the school environment that influenced students' stress responses (De Rubeis et al. 2024). Thus, one could conclude that teacher stress and its impact on students is not only dependent on temporal conditions but on other factors as well, such as students' perceptions of school safety (De Rubeis et al. 2024).

Returning to the discussion in Section 5.1.1. on the stress levels of the participating teachers, one could also infer that the moderate stress levels of the teacher sample of the current study might not be enough to produce a consistent negative impact on students' academic performance, when considered as an isolated factor. However, this statement is unlikely to be true given the existing research that even moderate stress levels have a direct psychological impact on students, solidifying the notion of emotional contagion (Oberle & Schonert-Reichl 2016). As the first ever study to establish the link between teachers' occupational stress and students' emotional regulation, the findings were unambiguous:

Children's morning cortisol levels significantly varied between classrooms (10% variability). [...] Higher levels of classroom teacher burnout significantly predicted the

variability in morning cortisol. Teacher burnout reduced the unexplained variability in cortisol at the classroom level to 4.6%. (Oberle & Schonert-Reichl 2016: 31-2)

Despite this conclusive evidence for the link between teacher stress and student emotional responses, the study by Oberle & Schonert-Reichl (2016) does not measure academic outcomes of students. Thus, it does not provide any straightforward evidence that students' stress as induced by teachers' emotional state affect their academic performance. The connection could merely be assumed. Jõgi and colleagues (Jõgi, Pakarinen & Lerkkanen 2023) have attempted to find evidence for this association by examining teachers' stress through salivary cortisol levels tests and through self-reporting instruments to see if stress influences their teaching practices and subsequently, their students' math learning outcomes. The findings provided no evidence for the impact of teachers' physiological stress, as indicated by salivary cortisol levels and self-reported stress levels, on students' academic performance (Jõgi, Pakarinen & Lerkkanen 2023)—a conclusion that aligns with the results of the main effect model. An important finding, however, showcased that teachers reporting lower-stress levels were more likely to use child-centered teaching practices (Jõgi, Pakarinen & Lerkkanen 2023). Clearly, this study underscores that there is no direct link between teacher stress and student emotional responses, however, it supports the view that teachers' stress levels influence students' academic performance indirectly through their teaching practices. In this regard, the current study does not evaluate the practices employed by teachers in their foreign language classes. Therefore, it cannot examine the link between teachers' stress levels and classroom practices. Still, if teacher stress had an indirect effect on students' learning outcomes through their teaching practices, the results from the analyses should indicate it. This perspective provides a plausible explanation for the significant interaction effect of stress and time, indicating that stress influence teachers' classroom practices, which in turn exert their effects on student performance across time. In fact, teacher stress in the classroom has been found to be accumulative in nature, meaning that its effects become more prominent as time passes (Oberle & Schonert-Reichl 2016). Given that the current study's teacher sample exhibits relatively similar, low-to-moderate stress levels, it is possible that the effects on student performance are rather subtle when they are investigated as an isolated entity. Nevertheless, the model fit comparison (see Section 4.5.) demonstrated that linear mixed effects model with stress as main effect is better than the null model, indicating that stress may hold some explanatory value. In addition, the time and stress interaction model performed better than the main effect model, which in turn suggests that the effects of teacher stress accumulate over time.

Stress-coping may also provide valid insights into the results of the current dataset. Herman and colleagues (Herman, Reinke & Eddy 2020) identified four distinct stress and coping profiles of middle school teachers. The researchers measured teachers' stress levels and coping abilities at the beginning of the school year (Herman, Reinke & Eddy 2020). This data was used to create stress and coping profiles, which were then utilized to predict teaching practices and student outcomes over time (Herman, Reinke & Eddy 2020). One of these profiles suggests that teachers with moderate stress levels—which is the case for the current teacher sample—may also have moderate coping abilities. This profile was characterized as "Moderate Stress/Moderate Coping" representing only 3% of the study's teacher sample (Herman, Reinke & Eddy 2020). Although this profile is not discussed in detail in the paper since the focus was placed on more extreme profiles, it is implied that this group of teachers tends to experience a balanced approach to stress and coping (Herman, Reinke & Eddy 2020). Indeed, stress is an inseparable part of our lives (Bidi et al. 2024), but what is more important is the way individuals perceives stressors in their lives. And while high stress levels may deteriorate one's mental and physical health (Ganzel, Morris & Wethington 2010), moderate stress levels could serve as a catalyst for action. Moderate stress levels could potentially urge an individual to stay attentive and responsive in fulfilling their duties. Moreover, this balanced state may have then contributed to a more stable teaching environment and more consistent academic outcomes for the students. Such a balanced approach could be associated with longer teaching experience (Herman, Reinke & Eddy 2020), which is the case for the teacher sample of the current study. While Herman and colleagues (Herman, Reinke & Eddy 2020) offer a plausible explanation for the results of the current study with the theoretical framework, it is important to note that the aforementioned stress and coping profile was the least prevalent one among the study's teacher sample (Herman, Reinke & Eddy 2020). Thus, it is unlikely that all 5 teachers in the current study would fall into this category. Still, it is possible that both their longer teaching experience and their moderate stress levels may have resulted in a relatively stable, stagnant student performance over time. This could possibly explain the lack of significant results from the main effect model for teacher stress.

Finally, it should be acknowledged that the existing literature does not provide conclusive evidence on the effects of teacher stress. In fact, several studies have also explored the lack of evidence for the link between teacher stress and student academic performance, as the present study's findings suggest. A meta-analysis of multiple studies by Montgomery &

Rupp (2005) revealed that teacher stress is directly related to teacher well-being and job satisfaction; however, the evidence that it does directly account for the learning outcomes of students is rather mixed or weak (Montgomery & Rupp 2005). Zee & Koomen (2016) had similar observations, claiming that teacher stress has an impact on teaching practices, emotional availability of the teachers, and the classroom climate, yet there is rarely a significant direct link between teacher stress and students' academic performance.

Overall, the contextualization of the results in the existing research revealed that there is no consensus among researchers on the effects of teachers' stress levels and their students' learning outcomes. This perspective aligns with the contradictory results of the statistical analyses. Moreover, the effects of teacher stress cannot be regarded as static and uniform. Instead, the impact of teacher stress on students has been found to be dependent on various temporal and contextual factors. Lastly, there also appears to be a clear link between teacher stress and their teaching practices—an aspect that was not explored in the current study, but one that offers an intriguing perspective on the mechanisms behind teacher stress and thus, is worth exploring in future research.

5.3. Teachers' mindset: Not quite significant, but not irrelevant either

Mindset research has become a widely applied and increasingly influential framework aimed at improving student learning outcomes. The concept of mindsets have been researched in the classroom context for decades now (Dweck & Repucci 1973, Dweck 1975, Diener & Dweck 1978), and a substantial body of evidence suggests that mindset could be a reliable factor in determining academic success. For instance, students with a growth mindset are more likely to perform better academically (Haimovitz, Wormington & Corpus 2011, Hong et al. 1999, Blackwell, Trzesniewski & Dweck 2007, Claro et al. 2016, Cury, Paunesku & Dweck 2006, Mangels et al. 2006). Furthermore, the beliefs that characterize each mindset—such as beliefs about intelligence, effort, and setbacks—play a crucial role in shaping a young person's academic achievements (Hildrew 2018). In this regard, several studies have provided compelling evidence that mindsets determine aspirations, motivation, goals, and attitudes towards challenges and effort (Robins & Pals 2002, Blackwell, Trzeniewski & Dweck 2007, Burnette et al. 2013, Yeager & Dweck 2012, Yeager, Dahl & Dweck 2018). Undoubtedly, these variables have an impact on student academic achievement. The existing literature also acknowledges a contrary viewpoint—that mindset does not predict learning

outcomes. A few studies have found no evidence supporting the link between student achievement and mindset (Li & Bates 2019, 2020). There is also evidence that the effects of mindset could vary in different cultural and social contexts (Lou & Li 2023, Dong & Kang 2022).

The current study's findings reflect these conflicting perspective on the role of mindset in academic achievement (see Section 3.4.). Although the statistical analysis did not identify teachers' mindset as a statistically significant predictor of student performance, additional model fit analyses provided evidence that teachers' mindset carries some explanatory value to student academic achievement. Similarly to the discussion about the influence of stress levels on teachers' teaching practices, prior research supports this notion that teacher mindset is a relevant factor in determining student learning outcomes. Teachers' beliefs about intelligence, in fact, shape their instructional practices in the classroom, which subsequently, influence the classroom dynamics and students' perceptions about learning, effort, and challenges (Rattan, Good & Dweck 2012, Yeager et al. 2019, Muenks, Wigfield, Yang & O'Neal 2017). For instance, teachers who successfully applied growth-mindset-oriented practices in the classroom were more likely to focus on conveying ideas about the necessity of effort for achievement and the commonality of emotional responses like frustration and hopelessness to setbacks.

Such classroom practices, however, have broader implications for the students and their academic development and well-being. Indeed, the link between mindset beliefs and teaching practices is another critical dimension of the current discussion. By implementing certain instructional practices, teachers create what educational psychologists refer to as 'affordances' (Hecht, Yeager, Dweck & Murphy 2021)—the physical and psychological features that an environment offers and which shape how an individual behaves (Gibson 1977: 127, Hecht, Yeager, Dweck & Murphy 2021: 2). In the classroom, certain affordances could promote growth- or fixed-mindset-oriented beliefs and encourage students to adopt them (Hecht, Yeager, Dweck & Murphy 2021). These affordances work in both positive and negative ways, as research shows. For example, certain teaching practices may unintentionally impose limitations on certain underrepresented groups of students (Canning, Muenks, Green & Murphy 2019), whereas others may enhance students' sense of belonging and motivate them to experiment (Muenks et al. 2020). In this sense, teacher mindset exerts its influence on student performance indirectly—by shaping the classroom environment through teaching practices and social norms that consequently affect the learning outcomes

of students. These effects of teachers' mindset on classroom practices has been documented by multiple studies (Rattan, Good & Dweck 2012, Haimovitz & Dweck 2017, Muenks, Wigfield, Yang & O'Neal 2017, Canning, Muenks, Green & Murphy 2019). For instance, Rattan and colleagues found out that growth-mindset-oriented teachers often used strategy-focused feedback, which in turn motivated students to persevere (Rattan, Good & Dweck 2012). Teachers endorsing the fixed mindset utilized comfort-oriented strategies, which was perceived by the students as low expectations (Rattan, Good & Dweck 2012). Teachers' mindset was also found to be related to classroom climate (Canning, Muenks, Green & Murphy 2019) and to the promotion of mastery- versus performance-oriented goal structures (Muenks, Wigfield, Yang & O'Neal 2017). Moreover, teachers with a growth mindset are more likely to employ practices that encourage their students to learn from their mistakes and not get discouraged by setbacks in the learning process, essentially influencing their behavior and attitudes (Haimovitz & Dweck 2017). Installing such beliefs in students is, undoubtedly, instrumental in creating a learning environment conducive to higher academic outcomes. Still, the causal link between teacher mindset and student achievement is mediated through various contextual factors, such as school environment and policies, classroom norms, and individual differences between students (Claro, Paunesku & Dweck 2016).

The findings of the present study align with this broader body of literature, indicating that teacher mindset is not a significant predictor of student achievement, yet it is still a relevant factor among many. Other studies have confirmed this complex, indirect, and context-dependent relationship. For instance, a study conducted in Shanghai City, mainland China, found that besides teachers' mindset, other factors such as positive school climate and supportive parenting practices determine student learning outcomes (Zhang & He 2025). Similarly, a recent meta-analysis of 50 studies found no significant association between teachers' growth mindset and their students learning outcomes (Bardach et al. 2024). The study attempted to identify teacher-related factors that play a role in academic performance. However, the results revealed that the most significant predictors were student characteristics, socioeconomic background, and specific teaching practices (Bardach et al. 2024). Teacher-specific traits, such as mindset and self-efficacy, were found to have only small or inconsistent effects on student academic achievement (Bardach et al. 2024). Related findings from a study conducted among STEM faculty yielded similar insights, emphasizing the relevance of teachers' demographic factors, such as age, ethnicity, gender, teaching

experience and tenure status, as well as institutional context. These aspects of appear to be far more reliable in predicting educational outcomes (Canning, Muenks, Green & Murphy 2019). Importantly, the effect of faculty mindset on both students' motivation and achievement held even after controlling for other instructors' characteristics, underscoring the small, yet meaningful impact of teacher mindset (Canning, Muenks, Green & Murphy 2019). Although the aforementioned studies have been conducted among varying age groups and international environments, their findings are straightforward. All of these studies underscore the relevance of contextual factors that might interfere with the effects of teachers' mindset on student learning outcomes.

Additionally, when regarding mindset as a relevant factor in student performance—albeit indirectly affecting it—one should also keep in mind the concepts of the so-called “false growth mindset” that research has identified in regard to teachers' mindset and the classroom practices they tend to employ. A false growth mindset refers to teachers who claim to hold a growth mindset but fail to implement it meaningfully in their teaching practices (Dweck & Yeager 2019, Kraft, Schwarz & Hooper 2018, O'Rourke et al. 2014). Due to its limited scope, the current study does not include qualitative data on teaching practices. Thus, it is not possible to determine whether some of the participating teachers exhibit a false growth mindset. This remains an important limitation.

Notably, while mindset emerged as a non-significant, yet relevant factor in student learning outcomes, teacher stress, as examined in Hypothesis 2, showed no significant relationship to student performance. This contrast highlights a potentially underexplored area in educational research: the comparative effects of different teacher variables on student learning outcomes. As of now, no studies offer a direct comparison of the influence of teacher mindset and stress. Future research could address this gap by exploring the interaction of these factors and the conditions under which they exert the greatest influence on student performance.

Finally, although the results of the study indicated that there is no statistically significant link between teacher mindset and student academic performance, it is essential to interpret these findings within the broader context of educational and psychological research. When isolated, single psychological constructs rarely exert large effects. As Yeager and Dweck argue (Yeager & Dweck 2020: 1281), small yet consistent effects, especially when implemented at scale or across a timeframe, may lead to meaningful changes. This is particularly relevant in the context of education where variables like motivation, grades, or

mental health are particularly slow to shift (Burnette et al. 2023: 175). Therefore, putting an overemphasis on statistical significance may distract researchers from subtle but practically relevant patterns. As Gelman (2018) points out, there should be greater attention paid to real-world variability and complexity rather than blindly focusing on p-values. In this regard, it is important to highlight that the present study was conducted within an authentic school setting. While certain limitations—discussed in more detail in Section 5.5.—should be taken into account, the findings reflect real-world variability. This suggests that, despite the absence of statistical significance, the observed effects carry practical and meaningful relevance in our understanding behind the role of teacher mindset in student learning outcomes.

To summarize, while the current findings do not provide solid, statistical evidence to confirm—or refute—Hypothesis 3, they are in line with a growing body of research suggesting that teacher mindset is a secondary yet relevant factor in shaping the efficacy of student learning. Thus, it would be more reasonable to interpret the role of mindset as a means for creating certain affordances in the classroom that exert influence on students' academic achievement. Moreover, the current discussion revealed that besides teachers' mindset, additional teacher-specific characteristics presumably contribute to the observed variability in student performance. This observation will be further investigated in the following section related to the complementary analysis (see Section 4.5.).

5.4. The teacher factor

As the results of the additional analysis revealed, the most significant predictor of student performance in this study was the individual teacher. This finding suggests that while teachers' stress and mindset might offer some explanatory value in understanding variation in student performance, other teacher-specific characteristics may come into play. The following section explores how this finding aligns with the existing body of literature on the topic and examines which teacher-related factors in particular may exert influence and essentially, contribute to student academic achievement.

One of the most researched teacher-related predictors of student achievement in literature is teaching experience (Bhai & Horoi 2019, Kini & Podolsky 2016, Flint, Rubie-Davies & Peterson 2024, Fernandez-Garcia et al. 2019). However, there is no consensus among researchers on its effects, and the findings indicate contradictory links between student performance and teachers' experience. For example, the role of teaching experience has been

measured and compared across different grades, with the effects declining as students progress through their education (Bhai & Horoi 2019, Kini & Podolsky 2016). In contrast, students of more experienced teachers were even found to perform better not only on tests, but also on other measures of achievements, such as regular attendance (Kini & Podolsky 2016). Yet, the relationship is not entirely consistent. Some studies highlight the opposite pattern—teacher experience or any other demographic characteristics like gender or age were no significant predictor of students' test scores (Jepsen 2005). Surprisingly, there is even evidence that teachers with less teaching experience are associated with better student performance (Fernandez-Garcia et al. 2019).

Beyond demographic characteristics, there is a growing body of research underscoring the role of teachers' classroom practices in shaping student learning outcomes. In fact, the effects of a teachers' classroom practices and other related teacher characteristics has been shown to be comparable in magnitude to the impact of students' own backgrounds (Wenglinsky 2002). These results emphasize that the teacher-specific factors are arguably as important as the student-specific factors in determining student learning outcomes themselves (Wenglinsky 2002). Moreover, these results demonstrate the relevance of teaching practices, highlighting the importance of *how*—not just *who*—teaches in the classroom. In this regard, considerable attention and effort has been invested in the development of sophisticated observational tools, designed to empirically evaluate the quality of teaching practices. One such tool, the Classroom Assessment Scoring System (CLASS), categorizes teaching behavior into distinct domains linked to students' developmental outcomes. Some of these domains include emotional and instructional support, as well as classroom organization (Pianta & Hamre 2009). The conducted analysis via this instrument have defined the most relevant dimensions of effective teaching practices, such as social-emotional interaction, cognitive support, and behavioral management (Hafen et al. 2015; Hamre et al. 2013). Additionally, research on specific methods of instruction revealed that dialogic—as opposed to monologic—manner of instruction was more effective in determining student achievement (Tao & Chen 2024). Engaging students in discussions where they could express their ideas as well as teachers' utilizing uptake questions were among the practices that showed significant effects to students learning outcomes (Tao & Chen 2024). A large-scale meta-analysis of 167 international studies, utilizing the Dynamic Model of Educational Effectiveness to classify teaching behaviors related to student learning, revealed that core effective teaching behaviors—e.g. structured instruction, feedback, active learning,

classroom management—show significant positive effects on achievement (Kyriakides, Christoforou & Charalambous 2013). Consistent with this, studies on teacher effectiveness have found that a substantial portion of classroom-level variance in student achievement can be attributed not to teacher beliefs or demographics, but to specific classroom behaviors and teaching interactions (Creemers & Kyriakides 2006, Muijs & Reynolds 2010). Research from various countries over the past three decades has consistently shown that classroom-level factors outweigh school-level influences in explaining differences in student performance (Kyriakides, Campbell & Gagatsis 2000, Scheerens & Bosker 1997). Moreover, students should not be excluded from this discussion. Indeed, student engagement appears to be a key mediator in the relationship between teaching practices and academic achievement. As Tao & Chen (2024) argue, engaged students are more likely to benefit from effective teaching practices, which indicates that student responsiveness amplifies the beneficial influence of instruction. In addition, teacher expectations play an indirect role in student academic success. Studies have provided evidence that when teachers hold high expectations, their students tend to exhibit more positive behavior, better attendance, and increased homework completion (Tomaszewski et al. 2022). As can be expected, all these aspects may favorably influence student academic performance. Evidently, classroom practices play a crucial role in determining student achievement. However, as discussed in sections 5.2. and 5.3., multiple factors—including psychological, demographic, and pedagogical factors—influence the teaching methods educators employ during their lessons. This complexity raises concerns about the feasibility of researching teaching practices in isolation and producing conclusive results.

In a separate but related line of research, several studies have investigated the “value-added” effects of teachers—not just on test scores, but on a range of non-cognitive outcomes, such as social behavior, motivation, and emotional resilience. Jennings and DiPrete (2010) found that teacher effects on kindergarten and first-grade students’ social and behavioral development exceeded their effects on academic achievement. Similarly, Ruzek et al. (2015) reported small yet meaningful teacher effects on seventh graders’ motivation, while Kraft (2019) observed teacher impacts on students’ self-reported grit, growth mindset, and effort. Other studies have also identified teacher-related influences on attendance, suspensions, grade progression, and graduation rates (Gershenson 2016, Koedel 2008, Ladd & Sorensen 2015). These findings align with the conceptualization of high-quality teaching put forth by Pianta and Hamre (2009), who argue that emotional and organizational support from

teachers is just as critical as instructional methods. Indeed, creating a predictable and emotionally safe learning environment can foster student motivation, self-regulation, and risk-taking in learning—factors central to academic success (Pianta & Hamre 2009).

Taken together, these findings further support the notion that while teacher mindset (and stress, possibly) may carry some explanatory power, it represents only one dimension of a broader set of teacher-related factors that shape educational outcomes. The variation in student performance observed in this study is likely attributable to a complex interplay of instructional quality, classroom climate, emotional support, teacher expectations, and student engagement—factors that future research should continue to examine in integrated and context-sensitive ways.

5.5. Limitations and directions for future research

The discussion of the present study's findings has yielded several noteworthy insights into the interactions between teachers' psychological constructs and student academic outcomes. However, contextualizing these results into the existing body of literature has also highlighted certain limitations that should be addressed in future research. By doing so, both the design and interpretation could be enhanced, essentially providing even more in-depth insights into the realm of educational psychology research.

To begin with, the sample consisted of only five teachers. This small sample size impose limitations on the generalizability, statistical power, and precision of the results. In addition, this limited number of participants led to non-normally distributed data. While this was accounted for by employing statistical methods appropriate for such small samples, such as Spearman's correlation, as well as complementary descriptive analysis were used to provide further support for the findings, the dataset is skewed, and the use of non-parametric methods imposes constraints. Thus, interpretations should be made with caution. Nonetheless, the results offer a useful foundation for future research; however, larger, more diverse samples should be collected to yield more conclusive results.

Secondly, the study utilizes self-report instruments to assess teachers' stress and mindset. Although such tools are a common and practical data collection method, they are susceptible to bias, as discussed in sections 5.1. Given that participation in the current study was voluntary and based on convenience sampling, concerns may arise in regard to the authenticity and reliability of some responses. It is plausible that participants may have

overestimated some mindset-related aspects or underreported stress levels due to social desirability or concerns about appearing unprofessional. While such bias cannot be verified, it is a well-documented limitation in psychological research (see more in Section 5.1.).

In addition, the stress questionnaire employed in the current study was standardized; however, the mindset instrument was not. This may further complicate the interpretation of the results of the current study. Thus, it would be beneficial for future studies to utilize validated instruments for both constructs. Beyond quantitative data, additional data collection procedures focused on qualitative measurement of related dimensions such as teachers' classroom behaviors and instructional practices should be considered. Exploring these aspects may offer more nuanced insights into the real-life manifestations of mindset and stress in the classroom.

In regard to student data, there are certain limitations that need to be acknowledged to improve future research on the topic. Firstly, the two-month interval between the administrations of the testing sessions may have been too brief to capture any meaningful or sustained changes in students' academic performance. Furthermore, the lack of additional student-level variables—such as age, gender, prior achievement, or motivation—limits the depth of the interpretations of the findings. To better control for confounding factors, future research would benefit from collecting such data. Additionally, given that students may have different foreign language teachers over time as they progress with their education, collecting information on previous teachers or extracurricular lessons could provide additional dimensions to exploring the various influences on student learning outcomes.

Overall, the present study offers a narrow but focused exploration of the relationships between teacher mindset, stress, and student academic performance. However, it does not account for a wider range of contextual or behavioral variables that could significantly shape these relationships. As such, the explanatory power of the findings is limited. Still, this research provides a valuable starting point and highlights relevant aspects for future investigation, particularly the need for more comprehensive, multi-variable models that integrate psychological, behavioral, and contextual factors in educational research.

6. Conclusion

The current master thesis found partial evidence for the significant association between the effects of teachers' psychological constructs, such as stress and mindset, on student academic performance across time. However, additional statistical analyses demonstrated that the teacher factor is the most reliable predictor of students' academic outcomes. Moreover, model comparisons analyses identified models incorporating fixed effects, such as teachers' mindset, stress levels as well as individual teachers, have greater predictive power than the null model. These results suggest that the aforementioned factors play a role in shaping students' academic achievement. Most notably, the interaction model for time and stress indicated a statistically significant association, suggesting that the impact of teacher stress changes over time. Although the results did not fully align with the initial expectations reflected in the 3 hypotheses of the current study, they nonetheless yielded noteworthy insights into the complex interplay of teacher-specific characteristics and student learning outcomes.

The present study identified a positive, non-significant correlation between teacher mindset and their stress levels. This unexpected results challenge existing views in the psychological and educational research that growth mindset-oriented individuals tend to experience lower stress levels. Thus, in the discussion part of the master thesis sought to find more nuanced interpretation of these results. Factors, such as perfectionistic tendencies, domain-specific tendencies related to emotions, as well as social desirability bias were identified, underscoring the importance of incorporating more complex models of mindset to better investigate how such psychological constructs interact with individuals' personality, professional background, and environment.

The mixed results related to the second hypothesis does not provide definitive conclusions on the effect of teacher stress on student performance. While stress as a main effect was not identified as a significant predictor of student learning outcomes, contradicting theories of emotional contagion, its significant interaction with time hints at its accumulative effects on students' academic success. This interpretation aligns with existing studies highlighting the dynamic, context-dependent effects of teacher stress on student academic performance. Additionally, previous research underscores the indirect effects of stress, which are often manifested through teachers' instructional quality, emotional regulation and support, and

classroom management practices. Taken together, these insights highlight the need for a more complex evaluation of both the direct and indirect effects of teacher stress levels mediated through classroom processes and circumstances.

Teacher mindset was not found to be a significant predictor of student test score, however, model comparison analyses suggested that incorporating mindset improved model fit. This finding is consistent with existing research on the indirect influence of mindset through teaching practices, classroom climate, and teacher-student interactions. Nevertheless, the potential interference of false growth mindset was identified, highlighting the need for future research to employ multiple methods to investigate whether teachers' reported beliefs align with their classroom practices.

In this study, the best-fitting statistical model was found to be the one incorporating the interaction between time and teacher, which further supports the idea that teacher-specific attribute are central to student performance. The discussion revealed that various teacher-related factors may contribute to student performance, however, classroom-level variables were identified as the most prominent ones.

These findings must be interpreted within the constraints of the current study's methodological limitations, such as small sample size, potential interferences of social desirability bias and self-perception distortions with the self-reported data, absence of standardized mindset evaluation tools as well as absence of additional student- and teacher-specific variables among others. Despite these limitations, the current thesis offers several contributions to the existing literature. Firstly, it challenges the assumption that growth mindset consistently reduces stress, opening new lines of inquiry into the interplay of these constructs, especially in professional environments. Secondly, it contributes to the mixed evidence regarding the direct impacts of teacher stress and mindset on student academic achievement. Instead, the results highlight the necessity of more sophisticated, multileveled instruments for investigation and data collection focusing on psychological, behavioral, and contextual factors.

The practical implications of these findings are twofold. On one hand, in the context of teacher professional context, the results indicate that growth mindset interventions should incorporate additional trainings in stress management strategies, emotional regulation, and work-life balance for maximum effectiveness. On the other hand, the results highlight the need to account for individual teacher characteristics that influence student learning

outcomes. This suggests that interventions and evaluations should focus on specific competencies and practices that drive student achievement, rather than relying solely on psychological constructs, such as stress and mindset.

Looking ahead, future research should seek ways to overcome the methodological limitations of the current study by incorporating larger samples, validated instruments for data collection, and longer observation periods. To gain further insights into the mechanisms shaping student performance, the use of mixed-method approaches is encouraged to account for the interplay between teachers' reported beliefs and their classroom practices. Finally, considering the multifaceted realities of educational environments, incorporating a broader set of variables—including teacher expectations, self-efficacy, job satisfaction, and school climate—would offer more reliable and comprehensive explanatory models.

Overall, the current master thesis did not provide conclusive evidence for the interplay between teachers' mindset and stress and their effects on student performance across time. Nonetheless, it has illuminated the intricate, often indirect ways in which teacher specific variables influence students' academic achievement. These findings signal a need for more complex investigation models that acknowledge the interplay between psychological constructs, professional training, and expectations as well as classroom practices and school climate. By gaining a deeper understanding of these dynamics, future research can contribute to the development of educational policies and interventions that not only enhance teachers' well-being but also foster more effective learning environments for students.

7. Bibliography

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8. Appendix 1: Teacher data collection instruments

Wilson Stress Profile for Teachers (WSPT)

Student Behavior	Never	Rarely	Sometimes	Often	Very often
1. I have difficulty controlling my class.					
2. I become impatient/angry when my students do not do what I ask them to do.					
3. Lack of student motivation to learn affects the progress of my students negatively.					
4. My students make my job stressful.					

Employee/Administrator Relations	Never	Rarely	Sometimes	Often	Very often
5. I have difficulty in my working relationship with my administrator(s).					
6. My administrator makes demands of me that I cannot meet.					
7. I feel I cannot be myself when I am interacting with my administrator.					
8. I feel my administrator does not approve of the job I do.					

Teacher/Teacher Relations	Never	Rarely	Sometimes	Often	Very often
9. I feel isolated in my job (and its problems).					
10. I feel my fellow teachers think I am not doing a good job.					
11. Disagreements with my fellow teachers are a problem for me.					
12. I get too little support from the teachers with whom I work.					

Parent/Teacher Relations	Never	Rarely	Sometimes	Often	Very often
13. Parents of my students are a source of concern for me.					
14. Parent's disinterest in their child's performance at school concerns me.					

15. I feel my students' parents think I am not doing a satisfactory job of teaching their children.					
16. The home environment of my students concerns me.					

Time Management	Never	Rarely	Sometimes	Often	Very often
17. I have too much to do and not enough time to do it.					
18. I have to take work home to complete it.					
19. I am unable to keep up with correcting papers and other schoolwork.					
20. I have difficulty organizing my time in order to complete tasks.					

Intrapersonal Conflicts	Never	Rarely	Sometimes	Often	Very often
21. I put self-imposed demands on myself to meet scheduled deadlines.					
22. I think badly of myself for not meeting the demands of my job.					
23. I am unable to express my stress to those who place demands on me.					
24. Teaching is stressful for me.					

Physical Symptoms of Stress	Never	Rarely	Sometimes	Often	Very often
25. The frequency I experience one or more of these symptoms is: stomachaches, backaches, elevated blood pressure, stiff neck, and shoulders.					
26. I find my job tires me out.					
27. I am tense by the end of the day.					
28. I experience headaches.					

Psychological/Emotional Symptoms of Stress	Never	Rarely	Sometimes	Often	Very often
29. I find myself complaining to others.					
30. I am frustrated and/or feel angry.					
31. I worry about my job.					
32. I feel depressed about my job.					

Stress Management Techniques	Never	Rarely	Sometimes	Often	Very often
33. I am unable to use an effective method to manage my stress (such as exercise relaxation techniques, etc.)					
34. Stress management techniques would be useful in helping me cope with the demands of my job.					
35. I am now using one or more of the following to relieve my stress: alcohol, drugs, yelling, blaming, withdrawing, eating, smoking.					
36. I feel powerless to solve my difficulties.					

Mindset Questionnaire

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1. You can always change basic things about the kind of person you are.				
2. Only a few people will be truly good at sports, you must be born with the ability.				
3. When I receive feedback on my performance, I often feel attacked.				
4. Boys are better at math, while girls are much better at languages.				
5. The harder you work at something, the better you become at it.				
6. You can learn new things, but you can't really change how intelligent/smart you are.				
7. No matter what kind of person you are, you can always change yourself.				
8. Anyone can become a well-known musician if they practice enough.				
9. I appreciate when other people give me ideas about ways to improve my teaching.				
10. You can do things differently, but the important parts of who you are can't really be changed.				
11. Truly smart people don't need to try hard – they can accomplish anything they want.				
12. Trying new things is stressful for me and I avoid it.				
13. An important reason why I like my job is because I constantly learn new things.				
14. Some students are good and kind, while other are not – they just don't change.				

15. An important reason why kids should do their homework is so they can learn from their mistakes.				
---	--	--	--	--

Scoring system of the mindset questionnaire	
Questions that support the growth mindset: 1, 5, 7, 8, 9, 13, 15 • Strongly Agree – 3 points • Agree – 2 points • Disagree – 1 point • Strongly Disagree – 0 points	Questions that support the fixed mindset: 2, 3, 4, 6, 10, 11, 12, 14 • Strongly Agree – 0 points • Agree – 1 point • Disagree – 2 points • Strongly Disagree – 3 points
○ Strong Growth Mindset: 45-33 points ○ Growth Mindset with some Fixed Ideas: 32-24 points ○ Fixed Mindset with some Growth Ideas: 23-15 points ○ Strong Fixed Mindset: 14-0 points	

9. Appendix 2: October testing session materials

Testing Session October: 3. grade

Ex. 1. Попълни./ Fill in.

1. M m, N n,, P p, Q q,, S s, T t,, V v, W w,, Y y,

2. one, two,, four,, six,

3. January, February,, April,, June, July,

Ex. 2. a/ an

..... orange

..... dog

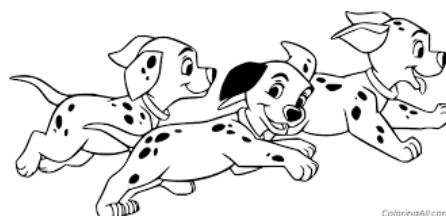
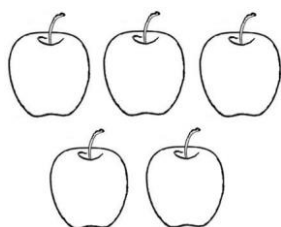
..... apple

..... house

..... book

..... ice cream

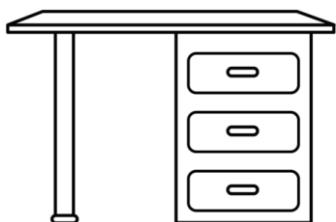
Ex. 3. Преброй./ Count.



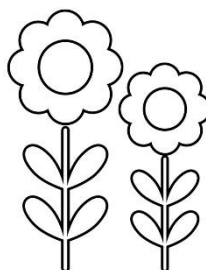
.....

.....

Ex. 4. Оцвети./ Colour.



blue and green



red and yellow

Testing Session October: 4. grade

1. He is from Italy. name is Frederico.

- a) He b) His c) Her

2. Where is the book? It's the desk.

- a) at b) in c) on

3. They are sisters and this is dog.

- a) their b) my c) our

4. There is bread.

- a) a b) any c) some

5. Mary like burgers?

- a) Does b) Don't c) Do

6. Is Bob football?

- a) play b) playing c) plays

7. Do you like pizza? No,

- a) I do. b) don't c) I don't

8. What time do you go to bed Sundays?

- a) in b) at c) on

9. Are there flowers in the room?

- a) any b) some c) a

10. The are running in the park.

- a) child b) dog c) children

11. How old is he?

- a) Eight. b) No, he isn't. c) Yes, I do.

12. Can you play football?

- a) Yes, I do. b) No, I can't. c) I don't.

13. Where's your mother?

- a) No, she isn't. b) It's in the box.

- c) In the bedroom.

14. Can you play the guitar?

- a) No, I can. b) I do. c) Yes, I can.

15. Who's this book?

- a) It's Bens'. b) It's Ben's. c) It's Ben.

16. My dog big ears.

- a) haven't got b) have got c) hasn't got

17. got a cow?

- a) Has you b) Do you c) Have you

18. The dog is sleeping the sofa.

- a) on b) at c) in

19. They to music at night.

- a) listens b) listening c) listen

20. the afternoon we go to the cinema.

- a) in b) on c) at

21.



- a) trousers
b) jacket
c) skirt

22.



- a) cow
b) sheep
c) dog

23.



- a) bike
b) train
c) kite

24.



- a) make a snowman
b) fly a kite
c) ride a bike

25.



- a) biscuits
b) chocolate
c) burger

Testing Session October: 5. grade, version 1

Part 1. Mark the correct answer.

1. This is Francesco..... from Italy.

- a) They are b) He is
c) We are d) She is

2. ‘.....in Class A?’ ‘Yes, we are.’

- a) We are b) They are
c) Are they d) Are you

**3. ‘Are Juan and Miguel from Spain?’
‘Yes, they....’**

- a) is b) aren’t
c) isn’t d) are

4. members of the music club.

- a) Are they b) He is
c) We are d) Are you

**5. My name is Pablo and this is
friend, Jorge.**

- a) his b) their c) my d) our

**6. He and sister, Maria, are from
Chile in South America.**

- a) his b) their c) my d) our

**7. Maria is twelve and brother is
thirteen.**

- a) his b) their c) her d) our

**8. Maria is a good friend, too. She’s in
5 class at.....school.**

- a) his b) my c) their d) her

**9. Wales is in the UK and
capital is Cardiff.**

- a) his b) their c) my d) its

**10. My parents are from Italy
favourite food is pizza.**

- a) his b) their c) my d) our

**11. These are my brothers, Jim and
Henry. favourite sport is football.**

- a) His b) Their c) My d) Our

**12. Magda and I are sisters.
parents are from Poland.**

- a) Their b) His c) Your d) Our

**13. ‘Pete and Jim, are these.....
shoes?’ ‘Yes, they are.’**

- a) your b) their c) my d) our

**14. ‘Hi, George. How you
today?’ ‘Fine, thanks.’**

- a) is b) isn’t c) aren’t d) are

**15. My parents are from England.
We’re**

- a) Australian b) Turkish
c) British d) Mexican

Part 2. Fill in the missing words.

A: (16)you in Sandra’s class at
school?

B: Yes, I (17).

A: (18) your teacher?

B: Mr Jones.

19., Tuesday, Wednesday,

20., Friday, Saturday, Sunday

Part 3. Write the numbers as words:

21. 81

22. 11

23. 99

24. 45

25. 63

Testing Session October: 5. grade, version 2

Part 1. Mark the correct answer.

1. Is he Bulgarian? No, he

- a) are b) is c) isn't d) aren't

2. I'm Jane and this is sister, Mary.

- a) your b) my c) her d) their

3. Carla is Spanish. parents are from Madrid.

- a) Her b) His c) Their d) Its

4. We are friends. favourite band is One Direction.

- a) Our b) Your c) Their d) Her

5. That's Mia's cat. name is Rufus.

- a) Their b) His c) Its d) Our

6. Emma and Paula are sisters. Maria is mother.

- a) your b) our c) my d) their

7. This is Francesco. from Italy.

- a) They are b) He is
c) We are d) She is

**8. 'Are Juan and Miguel from Spain?'
'Yes, they....'**

- a) is b) aren't c) isn't d) are

9. '.....in Class A?' 'Yes, we are.'

- a) We are b) They are
c) Are they d) Are you

**10. 'Are Juan and Miguel from Spain?'
'Yes, they....'**

- a) is b) aren't
c) isn't d) are

Part. 2 Fill in the missing words.

Have got

11. (+) They some coffee.

12. (-) We a new car.

13. (+) She a new hat.

14. (+) The school a swimming pool.

15. (-) I a big family.

There is/ There are

16. (+) two students in the classroom.

17. (-) many people here?

18. (-) any flowers in my garden.

19. (+) a TV in my room.

20. (-) a packet of crisps in your bag?

Part 3. Write the numbers as words:

21. fourteen

22. eight

23. a hundred

24. twenty-four

25. seventeen

Testing Session October: 6. grade, version 1

Part 1. Mark the correct answer.

1. Hi, my name Diana. What your name?

- a) is, are b) are, is c) is, is d) are, are

2. I Isabel. Are you new student?

- a) is, a b) am, an c) is, an d) am, a

3. Yes, I Is that tennis racket?

- a) is, his b) am, your
c) am, their d) am, our

4. Can I your MP3 player?

- a) borrow b) to borrow
c) borrowed d) is borrowing

5. We.....in Majorca two days ago.

- a) arrive b) are arriving
b) arriving c) arrived

6. Yesterday, the weather warm, it cold and rainy.

- a) wasn't, was b) is, was
c) isn't, is d) was, was

7. I like It's fun!

- a) shop b) shopping
c) shopped d) is shopping

8. there any chairs in the kitchen?

- a) Is b) Are c) Isn't d) -

9. My birthday is December.

- a) to b) on c) in d) at

10. We're going to the cinema Friday.

- a) at b) on c) in d) to

11. The bank is next the station.

- a) of b) on c) to d) in

12. I haven't got cake.

- a) some b) an c) any d) -

13. Have you got any?

- a) apple b) cheese
c) sandwich d) sock

14. My mum bought a new phone for my birthday.

- a) her b) his c) me d) them

15. I sometimes go with my friends when it is warm.

- a) study b) swimming
c) excited c) swim

Part 2. Fill in the missing words.

16. He is fastest runner in our class.

17. We go to school yesterday.

18. Please forget to phone me tomorrow.

19. My phone is smaller your phone.

20. Our teacher us a lot of homework last week.

Part 3. Write the missing word in each list.

21. sixteen, seventeen,

22., fourth, fifth, sixth

23. May, June, July,

24. Thursday, Friday,

25. eighth, ninth, tenth,

Testing Session October: 6. grade, version 2

Part 1. Circle the correct answer.

1. Hi, my name Diana. What your name?

- a) is, are b) are, is c) is, is d) are, are

2. I Isabel. Are you new student?

- a) is, a b) am, an c) is, an d) am, a

3. Yes, I Is that tennis racket?

- a) is, his b) am, your
c) am, their d) am, our

4. Can I your MP3 player?

- a) borrow b) to borrow
c) borrowed d) is borrowing

5. We.....in Majorca two days ago.

- a) arrive b) are arriving
b) arriving c) arrived

6. Yesterday, the weather warm, it cold and rainy.

- a) wasn't, was b) is, was
c) isn't, is d) was, was

7. I like It's fun!

- a) shop b) shopping
c) shopped d) is shopping

8. there any chairs in the kitchen?

- a) Is b) Are c) Isn't d) -

9. My birthday is December.

- a) to b) on c) in d) at

10. We're going to the cinema Friday.

- a) at b) on c) in d) to

11. The bank is next the station.

- a) of b) on c) to d) in

12. I haven't got cake.

- a) some b) an c) any d) -

13. Have you got any?

- a) apple b) cheese
c) sandwich d) sock

14. My mum bought a new phone for my birthday.

- a) her b) his c) me d) them

15. I sometimes go with my friends when it is warm.

- a) study b) swimming
c) excited c) swim

Part 2. Complete the gaps with the words from the box. There are two extra words.

16. He is fastest runner in our

than	doesn't	the	gives
don't		gave	didn't

class.

17. We go to school yesterday.

18. Please forget to phone me tomorrow.

19. My phone is smaller your phone.

20. Our teacher us a lot of homework last week.

Part 3. Write the missing word in each list.

21. sixteen, seventeen,

22., fourth, fifth, sixth

23. May, June, July,

24. Thursday, Friday,

25. eighth, ninth, tenth,

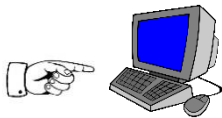
10. Appendix 3: December testing session materials

Testing Session December: 3. grade

Ex. 1 Read and circle.

1. I am/ is six.
2. He is/ are ten years old.
3. Is/ are she at school today?
4. They is/ are my friends.
5. Are/ is you eight years old?

Ex. 2 Underline.



1. **This/ That** is Bob's computer.



3. **These/ Those** are Frank's books.



2. **These/ Those** are Tina's balls.



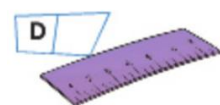
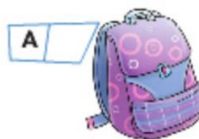
4. **This/ That** is Dylan's train.

Ex. 3 Complete the numbers.

1. e _ e _ en
2. f _ urt _ en
3. s _ _ _ nt _ _ n
4. tw _ nt _
5. n _ n _ t _ _ n

Ex. 4 Look, read and number.

1. It's a pen.
2. It's a desk.
3. It's a schoolbag.
4. It's a ruler.



Testing Session December: 5. grade

Part 1. Circle the correct answer.

1. My names are Sandra and Luca.

- a) friend's b) friends
c) friends' d) friend

2. Is that the children's football?

- a) Yes, it's their. b) Yes, it's mine.
c) Yes, it's theirs. d) Yes, it's hers.

3. Are these Joe's dirty socks?

- a) Yes, they're mine. b) Yes, they're his.
c) Yes, they're theirs. d) Yes, it is his.

4. guitar is expensive.

- a) Henries' b) Henry's
c) Henrys c) Henry

5. are my photos.

- a) That b) Those c) This d) It

6. is the new teacher.

- a) These b) Those c) This d) -

7. My name is Sandra Castle.

- a) friends b) friend
c) friends' c) friend's

8. Are these Sue's trainers?

- a) Yes, they're mine. b) Yes, they're hers.
c) Yes, they're theirs. d) Yes, it is his.

9. A: Is this your computer?

B: No. My parents use it.

- a) It's mine. b) It's hers.
c) It's his. d) It's theirs.

10. Is this my orange juice?

- a) Yes, it's their. b) Yes, it's mine.
c) Yes, it's theirs. d) Yes, it's yours.

Part 2. Complete the conversation with phrases from the box. There are two extra words.

altogether	anything else	can I have
here it is	how much are	please
how much is	can I borrow	here you are

A: Where's the menu?

B:

A: Thanks. the burgers?

B: £2.00.

A: OK. two burgers,?

B:

A: Thanks.

B:?

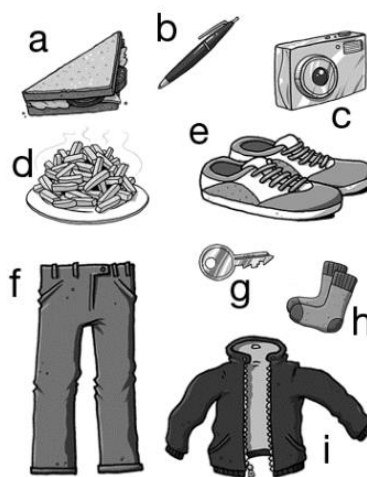
A: Yes, a cola and a tea.

B: Here you are.

A: Thanks. How much is that , please?

B: £7.50, please.

Part 3. Match the words (1–9) to the pictures (a–i)



- | | |
|-------------------|-------------------|
| 1. pen | 6. trousers |
| 2. camera | 7. key |
| 3. chips | 8. jacket |
| 4. sandwich | 9. socks |
| 5. trainers | |

Testing Session December: 6. grade, version 1

Part 1. Circle the correct answer.

1. Is there going on in town today?

- a) much b) many c) few d) a lot of

2. Our hotel is hotel in town.

- a) older b) oldest
c) the oldest d) more old

3. I've got CDs at home.

- a) much b) little c) a little d) a lot of

4. There aren't rooms in this house.

- a) much b) many c) a little d) –

5. The food here is than in other places in town.

- a) the cheapest b) the cheaper
c) most cheap d) cheaper

6. We haven't got space in the car.

- a) much b) little c) few d) many

7. There's ... traffic on the road today.

- a) much b) few c) many d) a lot of

8. Our hotel room has view.

- a) best b) more good
c) better d) the best

9. The birds and flowers here are than back home.

- a) beautiful b) most beautiful
c) more beautiful d) the more beautiful

10. Have you got homework today?

- a) many b) a lot of c) a few d) much

Part 2. Complete the gaps with the words from the box. There is one extra word.

high	wide	tall	far
heavy	long		

11. A: How are you?

B: One metre sixty.

12. A: How is it from London to Paris?

B: It is 343.96 kilometres by plane.

13. A: How is your bag?

B: It's 15 kilos.

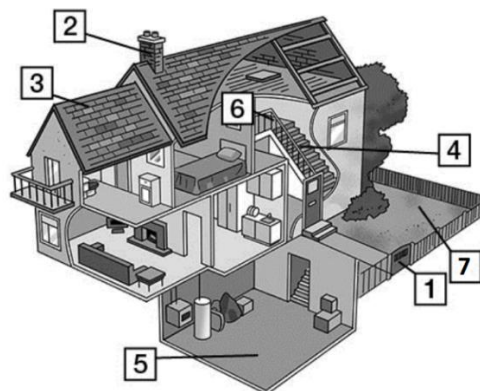
14. A: How is the River Thames?

B: It's 346 kilometres from beginning to end.

15. A: How is Mount Kilimanjaro?

B: It's 5,895 metres.

Part 3. Label the pictures.



1. g.....

2. c.....

3. r.....

4. s.....

5. b.....

6. l.....

7. g.....

Testing Session December: 6. grade, version 2

Part 1. Circle the correct answer.

1. Julie and Anna dinner on Saturdays.

- a) are cooking b) cooks
c) cook d) were cooking

2. Have you got sandwiches?

- a) some b) a c) any d) –

3. Jim and Kyla in the pool.

- a) enjoying to swim b) enjoy swimming
c) enjoy to swim d) enjoying swimming

4. They dinner right now.

- a) eats b) eat
c) are eating d) were eating

5. Tony to school by bus every day.

- a) go b) goes c) is going d) was going

6. Jessie to golf.

- a) prefers ice-skating
b) prefer to ice-skating
c) preferring ice-skate
d) preferring ice-skating

7. My friends team sports.

- a) don't like b) isn't linking
c) don't liking c) doesn't like

8. Alex usually tennis once a week.

- a) is playing b) plays c) play d) playing

9. There any chicken in the fridge.

- a) is b) was c) weren't d) isn't

10. There is cake.

- a) any b) no c) a few d) –

Part 2. Complete the gaps with the words from the box. There is one extra word.

shall fancy why
cycling that's great
feel let's museum
don't how good

11. A: What we do this weekend?

B: about going

12. A: don't we go out for snack?

B: That's a idea.

13. A: Why we go swimming?

B: a bit boring. Do you going to the beach?

A: idea. ask Sam to come, too!

Part 3. Label the pictures.



.....



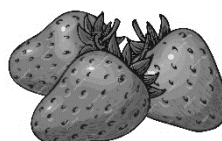
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