

LITERACY ACQUISITION IN GERMAN OR FRENCH IN THE PILOT PROJECT “ZESUMME WUESSEN!”

PRELIMINARY ÉPSTAN RESULTS OF STUDENT CHARACTERISTICS,
ACHIEVEMENT, MOTIVATION, AND PARENTAL SUPPORT

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EXECUTIVE SUMMARY – ENGLISH

- Luxembourg is a highly diverse country in terms of the linguistic, sociocultural, and socioeconomic composition of its population. This diversity is reflected in the Luxembourgish education system with an increasing share of students speaking language(s) other than Luxembourgish and/or German at home. In order to deal more adequately with the students' language diversity and to encounter educational inequalities that presumably result (at least in part) from a curriculum that places high language expectations on students, the **Luxembourgish government has implemented the literacy pilot project "Zesumme Wuessen!"** in four primary schools. This project allows C2.1 students to start literacy acquisition in French (ALPHA-French) or German (ALPHA-German) in mixed classes.
- For this report, data from the **Luxembourg School Monitoring Programme** (*Épreuves Standardisées, ÉpStan*) from autumn 2023 was analysed to get first information on the composition of the pilot project's student population (individual student background characteristics). Further, using standardised academic achievement tests, the students' achievement in selected key school competences in Cycle 2.1 (mathematics, Luxembourgish listening comprehension, as well as listening comprehension and early literacy in the language of literacy acquisition) was investigated. Additionally, questionnaire data was used to investigate the students' academic motivation and wellbeing (via student questionnaires), as well as the parents' perception to support their child academically (via parent questionnaires).
- **How is the C2.1 student population of the pilot project composed?** Both the ALPHA-French and the ALPHA-German students are characterised, on average, by a lower socioeconomic background than their peers following the regular curriculum at the national level. Regarding language background, students in the ALPHA-French group predominantly speak French and/or Portuguese, whereas students in the ALPHA-German group predominantly speak Luxembourgish and/or German at home. As the students participating in the pilot project differ in their student composition from the national level, the statistical method of **propensity score matching** was used to create **reference groups** of students with comparable background characteristics for both ALPHA-groups. These reference groups consist of students following the regular national curriculum, where they are learning to read and write in German.
- **How do the C2.1 students of the pilot project perform in the key academic domains?** The tests in **mathematics** and in **Luxembourgish listening comprehension** were administered in Luxembourgish to all the students (including those participating in the pilot project). **The results of these tests show that most C2.1 students have solid basic skills**, irrespective of the students' home language background and their language of literacy acquisition. The **listening comprehension** and the **early literacy tests** were administered in the students' language of literacy acquisition (conceptually similar tests). The results of these tests show that **students from the ALPHA-French group performed**

better compared to their peers with similar individual background characteristics (ALPHA-French reference group). This finding could potentially be explained by the fact that the ALPHA-French students completed the tests in French (a language linguistically closer to their home language), whereas students from the ALPHA-French reference group completed the tests in German (i.e., listening comprehension) and Luxembourgish (i.e., early literacy; two languages linguistically further away from their home language).

- **How does the pilot project affect the C2.1 students' academic motivation and wellbeing?** A large majority of students from all five groups expressed a **strong general academic motivation as well as a high academic wellbeing** at the beginning of primary education. Although students from the ALPHA-French and the ALPHA-German groups are taught in mixed classes (i.e., consisting of students from both groups), the results on wellbeing indicate that the students nevertheless perceived themselves as a cohesive class. When it comes to domain-specific academic motivation related to the language of literacy acquisition, students in **the ALPHA-French group expressed higher academic interest related to enjoyment of their language of literacy acquisition** (i.e., reading in French) compared to the ALPHA-French reference group. This finding seems particularly noteworthy in the light of research findings showing a positive relation between reading and long-term academic achievement.
- **How does the pilot project affect the parents' perception of how they can support their child academically?** Parents from the **ALPHA-French group perceived themselves as being more able to support their child academically** (e.g., in literacy acquisition) due to their own language skills in French. This observation seems particularly notable when compared to parents of students with similar background characteristics (i.e., ALPHA-French reference group) who often perceived themselves less able to support their child academically due to their own language skills in German. These findings seem particularly important in the light of research linking scholastic parental support to academic achievement.
- The findings of the present report allow for a first evaluation of the pilot project, although they should be interpreted with caution due to several **statistical and methodological limitations**. Besides the **small size of the ALPHA-French and the ALPHA-German groups**, it is important to highlight that direct comparisons of the group results in the students' language of literacy acquisition should be interpreted with caution as these **specific language tests were not identical**, but conceptually similar.
- Despite the described statistical and methodological limitations, the findings of the present report offer a **first important indication that the literacy pilot project could potentially contribute to addressing the existing educational inequalities in Luxembourg** at the beginning of primary school when students start literacy acquisition, considering that students from the ALPHA-French group



showed **higher achievement scores in both tests assessing their language of literacy acquisition** and a **higher domain-specific academic motivation to learn and read in French** compared to students with similar background characteristics learning to read and write in German.

- By continuously integrating the classes participating in the literacy pilot project into the well-established school monitoring programme, **the ÉpStan will allow for a more in-depth analysis of potential educational outcome differences** between students pursuing their literacy acquisition in French compared to students pursuing their literacy acquisition in German in the near future (e.g., developmental trajectories).

EXECUTIVE SUMMARY – FRANÇAIS

- Le Luxembourg est un pays très diversifié en termes de composition linguistique, socioculturelle et socio-économique de sa population. Cette diversité se reflète dans le système éducatif luxembourgeois, avec une part croissante d'élèves parlant une, voire plusieurs langues autres que le luxembourgeois et/ou l'allemand à la maison. Pour mieux répondre à la diversité linguistique de la population scolaire et pour faire face aux inégalités éducatives, résultant (au moins partiellement) d'un programme d'études imposant des exigences linguistiques élevées aux élèves, **le gouvernement luxembourgeois a mis en œuvre le projet pilote d'alphabétisation « Zesumme Wuessen !»** dans quatre écoles fondamentales. Ce projet permet aux élèves de C2.1 de commencer l'apprentissage de la lecture et de l'écriture en français (ALPHA-français) ou en allemand (ALPHA-allemand) dans des classes mixtes.
- Pour ce rapport, les données du **Luxembourg School Monitoring Programme (Épreuves Standardisées – ÉpStan)** d'automne 2023, ont été analysées afin d'obtenir des informations sur la composition du groupe d'élèves participant au projet pilote (caractéristiques du milieu familial des élèves). Par ailleurs, à l'aide des épreuves standardisées dans certains domaines académiques clés (mathématiques, compréhension orale du luxembourgeois, ainsi que compréhension orale et précurseurs de la compréhension de l'écrit dans la langue d'alphabétisation), les résultats des élèves du cycle 2.1 ont été analysés. Par ailleurs, des données issues de questionnaires ont été utilisées pour étudier la motivation et le bien-être scolaire des élèves (questionnaires destinés aux élèves), ainsi que la perception des parents quant à leur propre capacité à soutenir leur enfant dans ses apprentissages scolaires (questionnaires destinés aux parents).
- **Comment se caractérise la population des élèves du projet pilote au cycle 2.1 ?** En moyenne, les élèves du groupe ALPHA-français et du groupe ALPHA-allemand se caractérisent par un niveau socio-économique plus bas que celui de leurs pairs suivant le programme d'études national. En ce qui concerne le contexte linguistique familial, les élèves du groupe ALPHA-français parlent principalement le français et/ou le portugais, tandis que les élèves du groupe ALPHA-allemand parlent principalement le luxembourgeois et/ou l'allemand à la maison. Étant donné que la composition des élèves qui participent au projet pilote diffère de celle des élèves au niveau national, la méthode statistique de **propensity score matching** a été utilisée afin de créer **des groupes de référence** d'élèves présentant des caractéristiques comparables aux deux groupes ALPHA. Ces groupes de référence sont constitués d'élèves suivant le programme d'études national et alphabétisés en allemand.
- **Quels résultats les élèves du projet pilote du cycle 2.1 obtiennent-ils dans les domaines académiques clés ?** L'épreuve de **mathématiques** et l'épreuve de **compréhension orale du luxembourgeois** sont administrées en luxembourgeois à l'ensemble des élèves (projet pilote inclus).

Les résultats de ces épreuves montrent que la plupart des élèves disposent **de solides connaissances de base**, indépendamment de leurs langues familiales et de leur langue d'alphabétisation. L'épreuve de **compréhension orale** et l'épreuve **précurseurs de l'écrit** sont administrées dans la langue d'alphabétisation des élèves (épreuves conceptuellement proches). Les résultats de ces deux épreuves montrent que les élèves du **groupe ALPHA-français ont obtenu de meilleurs résultats** que les élèves du groupe de référence présentant des caractéristiques individuelles similaires. Ce constat pourrait s'expliquer par le fait que les élèves du groupe ALPHA-français ont passé les épreuves en français (une langue linguistiquement plus proche de leur langue familiale), alors que les élèves du groupe de référence ont passé les épreuves en allemand (compréhension orale) et en luxembourgeois (précurseurs de la compréhension de l'écrit ; deux langues linguistiquement plus éloignées de leur langue familiale).

- **Comment le projet pilote affecte-t-il la motivation et le bien-être scolaire des élèves du cycle 2.1 ?** Une grande majorité des élèves des cinq groupes ont exprimé une **forte motivation scolaire générale et un bien-être scolaire élevé** au début de l'enseignement fondamental. Même si les élèves des groupes ALPHA-français et ALPHA-allemand suivent certains cours dans des classes mixtes (c'est-à-dire composées d'élèves alphabétisés en allemand et en français), les résultats sur le bien-être scolaire indiquent que les élèves se sentent néanmoins comme une partie intégrante du groupe classe (avec une bonne cohésion). En ce qui concerne la motivation scolaire spécifique à la langue dans laquelle ils sont alphabétisés, les élèves du **groupe ALPHA-français ont exprimé un intérêt scolaire lié à l'appréciation de leur langue d'alphabétisation plus élevé que celui du groupe de référence ALPHA-français** (p.ex. en lecture). Ces constats semblent s'aligner avec les résultats de recherche montrant un lien significatif entre les compétences en lecture et la réussite scolaire à plus long terme.
- **Comment le projet pilote affecte-t-il la perception des parents quant à leur propre capacité à soutenir leur enfant dans ses apprentissages scolaires ?** Comparé aux parents des élèves de leur groupe de référence, les parents du groupe ALPHA-français se sentent plus à même de soutenir leur enfant dans ses apprentissages scolaires (p.ex. acquisition de la lecture) grâce à leurs propres compétences linguistiques en français. En d'autres termes, les parents des élèves du groupe de référence ALPHA-français se sentent moins capables de soutenir leur enfant dans ses apprentissages scolaires en raison de leur compétences linguistiques en allemand. Ces résultats semblent s'aligner avec les résultats de recherche montrant un lien entre la capacité des parents à soutenir leur enfant dans ses apprentissages et la réussite scolaire.
- Les résultats du présent rapport permettent une première évaluation du projet pilote, même s'ils doivent être interprétés avec prudence en raison de **différentes limites statistiques et méthodologiques**. Premièrement, la **taille des groupes ALPHA-français et ALPHA-allemand est**

petite. Deuxièmement, les épreuves (compréhension orale et précurseurs de l'écrit) diffèrent en raison de la langue d'alphabétisation bien que leur conception soit semblable. Ainsi, les comparaisons directes des résultats entre les groupes doivent être interprétées avec prudence.

- Malgré les limites statistiques et méthodologiques décrites, les résultats du présent rapport montrent que **le projet pilote d'alphabétisation** pourrait potentiellement **contribuer à remédier aux inégalités éducatives au Luxembourg observées au début du parcours scolaire**. En effet, les élèves du groupe ALPHA-français ont obtenu de meilleurs résultats aux deux épreuves évaluant leurs compétences dans leur langue d'alphabétisation et ils ont exprimé une motivation scolaire plus élevée pour apprendre à lire et à écrire en français comparé aux élèves de leur groupe de référence qui apprennent à lire et à écrire en allemand.
- En intégrant progressivement les classes participant au projet pilote dans le *Luxembourg School Monitoring Programme*, les ÉpStan permettront une **analyse plus approfondie des différences potentielles dans les résultats scolaires** entre les élèves poursuivant leur alphabétisation en français et les élèves poursuivant leur alphabétisation en allemand dans un avenir proche (p. ex., développement longitudinal des résultats scolaires).

EXECUTIVE SUMMARY – DEUTSCH

- Luxemburg ist in Bezug auf die sprachliche, soziokulturelle und sozioökonomische Zusammensetzung seiner Bevölkerung ein äußerst vielfältiges Land. Diese Vielfalt spiegelt sich auch im nationalen Bildungssystem wider, in dem der Anteil an Schüler*innen, die zu Hause andere Sprachen als Luxemburgisch und/oder Deutsch sprechen, steigt. Um der sprachlichen Vielfalt der Schülerschaft gerecht zu werden und um Bildungsungleichheiten entgegenzuwirken, die (zumindest teilweise) aus einem Lehrplan resultieren, der hohe sprachliche Anforderungen an die Schüler*innen stellt, **hat die luxemburgische Regierung das Pilotprojekt zur Alphabetisierung „Zesumme Wuessen!“** ins Leben gerufen. An den vier am Projekt beteiligten Grundschulen lernen Schüler*innen des C2.1 in gemischten Klassen zunächst entweder auf Französisch (ALPHA-Französisch) oder auf Deutsch (ALPHA-Deutsch) Lesen und Schreiben.
- Dem vorliegenden Bericht liegen Daten des **Luxembourg School Monitoring Programme** (*Épreuves Standardisées - ÉpStan*) zugrunde, die im Herbst 2023 erhoben wurden. Sie liefern (anhand der individuellen Hintergrundmerkmale der Schüler*innen) erste Informationen über die Zusammensetzung der Schülerschaft, die am Pilotprojekt teilnimmt. Zusätzlich kamen standardisierte Leistungstests zum Einsatz, mit denen die Leistungen der Schüler*innen in einigen ausgewählten Schlüsselkompetenzen des Zyklus 2.1 (Mathematik, Luxemburgisch-Hörverstehen sowie Hörverstehen und Vorläuferfertigkeiten zur Schriftsprache in der jeweiligen Alphabetisierungssprache) erfasst wurden. Darüber hinaus wurden Fragebogendaten (aus Schüler- und Elternfragebögen) ausgewertet. Sie geben zum einen Aufschluss über die schulische Motivation und das Wohlbefinden der Schüler*innen, zum anderen spiegeln sie die Einschätzungen der Eltern dazu wider, wie weit sie ihr Kind bei seinem schulischen Lernen unterstützen können.
- **Wie setzt sich die C2.1-Schülerschaft des Pilotprojekts zusammen?** Schüler*innen der ALPHA-Französisch-Gruppe und der ALPHA-Deutsch-Gruppe haben im Durchschnitt einen niedrigeren sozioökonomischen Status als Schüler*innen, die dem regulären Lehrplan auf nationaler Ebene folgen. Was den sprachlichen Hintergrund betrifft, so sprechen Schüler*innen der ALPHA-Französisch-Gruppe zu Hause überwiegend Französisch und/oder Portugiesisch, während Schüler*innen der ALPHA-Deutsch-Gruppe überwiegend Luxemburgisch und/oder Deutsch sprechen. Da sich die am Pilotprojekt teilnehmenden Schüler*innen in ihrer Zusammensetzung von der Schülerschaft auf nationaler Ebene unterscheiden, wurde **die statistische Methode des Propensity Score Matchings** angewandt, um **Referenzgruppen** von Schüler*innen mit vergleichbaren Hintergrundmerkmalen für beide ALPHA-Gruppen zu bilden. Diese Referenzgruppen bestehen aus Schüler*innen, die dem regulären luxemburgischen Lehrplan folgen und dementsprechend auf Deutsch alphabetisiert werden.

- Wie schneiden die C2.1-Schüler*innen des Pilotprojekts in akademischen Schlüsselkompetenzen ab?** Die Tests in Mathematik und Luxemburgisch-Hörverstehen wurden von allen Schüler*innen (einschließlich der Schüler*innen des Pilotprojekts) auf Luxemburgisch durchgeführt. **Die Ergebnisse zeigen, dass die meisten C2.1-Schüler*innen über solide Grundkenntnisse in diesen beiden Kompetenzbereichen verfügen** – und das unabhängig von ihrem individuellen Sprachhintergrund und der Sprache, in der sie Lesen und Schreiben lernen. Die Tests zum Hörverstehen und zu den Vorläuferfertigkeiten der Schriftsprache wurden in der jeweiligen Alphabetisierungssprache der Schüler*innen durchgeführt (konzeptuell ähnliche Tests). Hier zeigt sich, dass die **Schüler*innen der ALPHA-Französisch-Gruppe besser abgeschnitten haben als die Schüler*innen der ALPHA-Französisch-Referenzgruppe** bestehend aus Schüler*innen mit vergleichbaren individuellen Hintergrundmerkmalen. Dieser Befund lässt sich möglicherweise dadurch erklären, dass die Tests in der ALPHA-Französisch-Gruppe auch auf Französisch bearbeitet wurden (sodass sie linguistisch eine größere Nähe zum Sprachhintergrund der Schüler*innen aufwiesen). Die Schüler*innen der ALPHA-Französisch-Referenzgruppe bearbeiteten diese Tests hingegen auf Deutsch (Hörverstehen) und Luxemburgisch (Vorläuferfertigkeiten der Schriftsprache, also in zwei Sprachen, die linguistisch weiter vom Sprachhintergrund der Schüler*innen entfernt sind).
- Wie wirkt sich das Pilotprojekt auf die akademische Motivation und das Wohlbefinden der C2.1-Schüler*innen aus?** In allen fünf Vergleichsgruppen gab eine große Mehrheit der Schüler*innen im Fragebogen an, über eine **ausgeprägte allgemeine schulische Motivation und ein hohes Maß an schulischem Wohlbefinden** zu verfügen. Die Ergebnisse zum Wohlbefinden deuten zudem darauf hin, dass die Schüler*innen des Pilotprojekts sich in den gemischten Klassen nicht einer von zwei getrennten Gruppen (ALPHA-Französisch oder ALPHA-Deutsch) zuordnen, sondern in einem einzigen, zusammengehörenden Klassenverband verorten. In Hinblick auf die schulische Motivation in der Alphabetisierungssprache bekundeten die **Schüler*innen der ALPHA-Französisch-Gruppe ein höheres Maß an Interesse und Freude an ihrer Alphabetisierungssprache** (sprich am Lesen auf Französisch) als die Schüler*innen der ALPHA-Französisch-Referenzgruppe. Dieses Ergebnis erscheint vor dem Hintergrund von Forschungsergebnissen, die einen positiven Zusammenhang zwischen der anfänglichen Lesemotivation und den späteren schulischen Leistungen belegen, besonders bedeutsam.
- Wie wirkt sich das Pilotprojekt auf die Wahrnehmung der Eltern aus, wie sie ihr Kind schulisch unterstützen können?** Die Eltern der ALPHA-Französisch-Gruppe sahen sich aufgrund ihrer eigenen **Sprachkenntnisse in Französisch eher dazu in der Lage, ihr Kind schulisch** (wie etwa beim Schriftspracherwerb auf Französisch) **zu unterstützen**. Anders sah es bei den Eltern der ALPHA-Französisch-Referenzgruppe aus, die vergleichbare Hintergrundmerkmale aufweisen und deren Kinder dem regulären luxemburgischen Lehrplan entsprechend auf Deutsch alphabetisiert werden. Sie sahen sich aufgrund ihrer Sprachkenntnisse in Deutsch weniger häufig dazu in der

Lage, ihr Kind schulisch zu unterstützen. Berücksichtigt man die Forschungsergebnisse, die einen positiven Zusammenhang zwischen der elterlichen Unterstützung und den schulischen Leistungen der Kinder aufdecken, erscheint auch diese Beobachtung besonders relevant.

- Auch wenn die vorliegenden Ergebnisse eine erste Einschätzung des Pilotprojekts ermöglichen, unterliegen sie **statistischen und methodischen Einschränkungen**. Neben der **geringen Größe der beiden ALPHA-Gruppen** ist beim direkten Vergleich und der Interpretation der Ergebnisse zum Lernfortschritt in der jeweiligen Alphabetisierungssprache unbedingt zu berücksichtigen, dass die **sprachspezifischen Tests nicht identisch**, sondern konzeptionell ähnlich waren.
- Trotz dieser statistischen und methodischen Einschränkungen liefern die Ergebnisse des vorliegenden Berichts **einen ersten wichtigen Hinweis darauf, dass das Pilotprojekt zur Alphabetisierung potenziell dazu beitragen könnte, den bestehenden Bildungsungleichheiten in Luxemburg** gleich zu Beginn der Grundschulzeit, also sobald die Schüler*innen mit dem Schriftspracherwerb beginnen, **zu begegnen**. Denn die **Schüler*innen der ALPHA-Französisch-Gruppe erzielten in den französischsprachigen Tests** nicht nur **bessere Leistungen** als die Schüler*innen der Referenzgruppe, die vergleichbare Tests auf Deutsch bearbeiteten, sie berichteten auch über eine **höhere schulische Motivation und über mehr Freude am Lernen und Lesen in französischer Sprache**, als Schüler*innen mit vergleichbaren Hintergrundmerkmalen, die auf Deutsch Lesen und Schreiben lernen.
- Durch die kontinuierliche Einbindung der am Pilotprojekt zur Alphabetisierung teilnehmenden Klassen in das bereits etablierte Schulmonitoring **werden die ÉpStan es in naher Zukunft erlauben, mögliche Leistungsunterschiede** von Schüler*innen, die ihre Alphabetisierung auf Französisch fortsetzen, im Vergleich zu Schüler*innen, die ihre Alphabetisierung auf Deutsch fortsetzen, **eingehender zu analysieren** (z. B. Entwicklungsverläufe).

...

INTRODUCTION

THE LITERACY PILOT PROJECT

“ZESUMME WUESSEN!”

1. INTRODUCTION

1.1 EDUCATIONAL INEQUALITIES IN LUXEMBOURG

Luxembourg has a highly diverse population in terms of its socioeconomic, cultural, and linguistic composition, and this high diversity is reflected in the education system. Recent key figures illustrated, for example, that a growing percentage of primary (68 %) and secondary (65 %) school students speak a language other than Luxembourgish at home (SCRIPT & MENJE, 2023a). Although this high diversity is a great asset, both national (Luxembourg School Monitoring Programme “*Épreuves Standardisées*” – ÉpStan; Martin et al., 2015) and international (Programme for the International Student Assessment – PISA; OECD, 2018) large-scale assessment studies have identified significant achievement differences in key school competences (e.g., reading, mathematics) between student groups. Results have shown repeatedly that students with a low socioeconomic status (SES) and/or students speaking a language other than Luxembourgish and/or German at home are especially at risk of struggling academically in the Luxembourgish education system (Boehm et al., 2016; Hadjar et al., 2018; Hornung et al., 2021) and that the identified achievement gaps increase over the educational trajectories (Sonnleitner et al., 2021).

These educational inequalities are assumed to result at least partially from the challenging multilingual curriculum of the Luxembourgish education system (LUCET & SCRIPT, 2023; Sattler, 2022). Whereas Luxembourgish is the main instruction language in *Cycle 1* (consisting of one optional year of *Éducation Précoce* and two compulsory years of *Éducation Préscolaire*) and an important mean to facilitate understanding and communication in a plurilingual school population (MENJE, 2018), the language of literacy acquisition in *Cycle 2* (of schools following the Luxembourgish curriculum) is German and key school competencies such as reading, writing and mathematics are taught in German. After introducing students to oral French during *Cycle 2*, written French is taught in *Cycle 3* as an additional language. The use of the three official languages of the country (Luxembourgish, German, French) as instruction languages throughout primary and secondary education and the high language expectations of the multilingual curriculum seem to present, however, an important challenge for a growing number of students (e.g., achievement gaps, grade retentions¹; Hornung et al., 2021; ONQS, 2022).

In light of (inter)national studies showing that students are at risk of being academically disadvantaged when the language spoken at home differs from the instruction language(s) in school (Hadjar et al., 2018; Röthlisberger et al., 2021; for a systematic review see Rogde et al., 2019) and in order to deal more adequately with the language diversity of the student population, the Luxembourgish government has introduced various educational projects that are aiming at

¹ *Allongement de Cycle.*

encountering the existing educational inequalities. Among these are, for example, the national multilingual education programme for children between one and four, in which French is promoted early on in playful activities while integrating the children's home languages through verbal usage (Hornung et al., 2023; Kirsch, 2018), the introduction of International Public Schools, which allow students to choose a main instruction language among three available language sections (German, French, and English; for an overview see LUCET & SCRIPT, 2023), and the literacy pilot project "Zesumme Wuessen!" established in four primary schools that gives students in *Cycle 2.1* the possibility of learning to read and write in French (MENJE, 2022). As this pilot project is the focus of the present report, it is going to be presented in more detail in the following.

1.2 THE LITERACY PILOT PROJECT "ZESUMME WUESSEN!"

Following a motion adopted by the Chamber of Deputies in March 2022 that invited the government to broaden the linguistic offer within primary schools following the Luxembourgish curriculum by drawing on the educational concept established in the *International Public Schools* (Chamber of Deputies, 2022), the Ministry of Education, Children and Youth has implemented the literacy pilot project "Zesumme Wuessen!" that gives students in *Cycle 2.1* the possibility of learning to read and write in French.

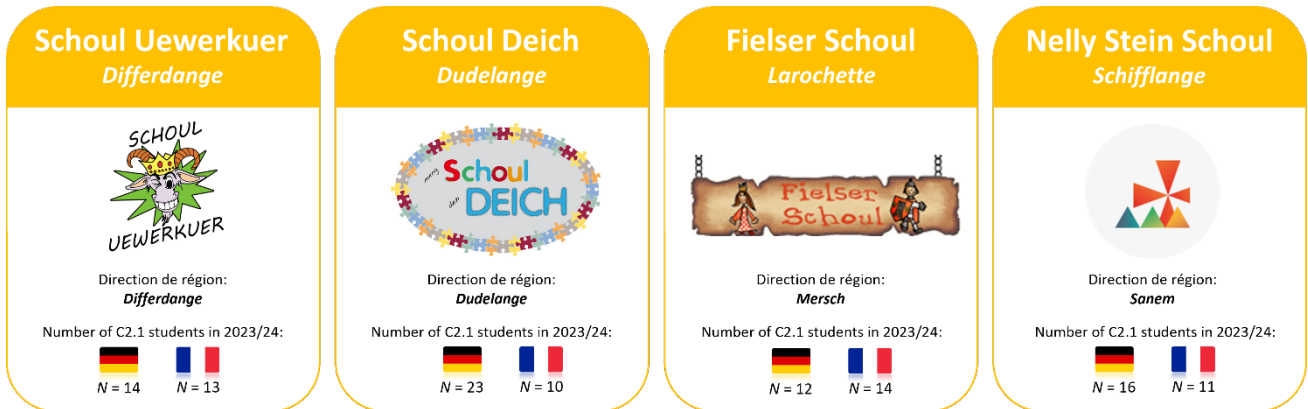
1.2.1 THE FOUR PARTICIPATING SCHOOLS AND THEIR CONCERTATION NETWORK

The four schools participating in the pilot project were selected according to different criteria (e.g., size of the municipalities, composition of the student population regarding aspects such as language and migration background). By implementing the pilot project in diverse school contexts (SCRIPT & MENJE, 2023b), conclusions on a potential extension of the literacy acquisition programme at the national level can be drawn more adequately after a comprehensive scientific evaluation.

At the start of the 2022/23 school year, the literacy pilot project was launched in *Cycle 1.2* (final year of *Éducation Préscolaire*) of **Schoul Uewerkuer** (*École fondamentale de Differdange*), **Schoul Deich** (*École fondamentale de Dudelange*), **Fielser Schoul** (*École fondamentale de Larochette*) and **Nelly Stein Schoul** (*École fondamentale de Schifflange*). In the **Nelly Stein Schoul**, the pilot project was, in addition, simultaneously launched in *Cycle 2.1* (first year of primary education).

Figure 1 gives an overview of the participating schools with regard to their municipality, their *Direction de Région* and the number of children that were allocated to the German and the French literacy group. The numbers refer to the start of the 2023/24 school year that marks the first timepoint at which the children have been assessed within the Luxembourg School Monitoring Programme "Épreuves Standardisées" (ÉpStan).

Figure 1 - Overview of the Schools Participating in the Pilot Project (School Year 2023/24)



Note. Figure adapted from SCRIPT & MENJE (2023b, p. 6) and from <https://alpha.script.lu/fr/projet/ecoles>.

In order to support the four participating schools in the implementation of the pilot project, a network consisting of actors from different fields and levels has been set into place. Whereas the SCRIPT (*Service de Coordination de la Recherche et de l'Innovation pédagogiques et technologiques*) and the involved *Directions de Région* coordinate the implementation at the national (e.g., conceptualisation, project coordination, provision of financial resources) and regional level (e.g., support of teachers in the pilot schools, project management) respectively, teachers from the International Public Schools guide and support the participating schools when it comes to the project's pedagogical aspects (e.g., selection and usage of teaching material, specificities of literacy acquisition in French). Moreover, the IFEN (*Institut de Formation de l'Éducation Nationale*) offers a training programme that is specifically designed to meet the needs and interests of teachers that are involved or interested in the pilot project (SCRIPT & MENJE, 2023b). In addition, the teachers in the pilot project are meeting regularly in the scope of a working group within their respective schools. They are furthermore participating on a monthly basis in a so-called *réseautage*, in which teachers from all four schools come together in order to foster the exchange on their experiences regarding the implementation of the pilot project (e.g., organisational aspects, usage of material and didactical approaches; SCRIPT & MENJE, 2023b).

1.2.2 EDUCATIONAL CONCEPT AND FUNCTIONING OF THE PILOT PROJECT

With the aim to diversify the language offer within schools following the Luxembourgish curriculum, the pilot project "Zesumme Wuessen!" offers C2.1 students the choice of a literacy acquisition within mixed classes in either French or German. For students opting for a French literacy acquisition, French becomes the first written and spoken language (language of literacy acquisition), while oral German is introduced in Cycle 2 and written German starts to be taught in Cycle 3. Thus, the order of introduction of the languages and the related expectations have been reversed compared to those students that are learning to read and write in German (MENJE, 2023b).

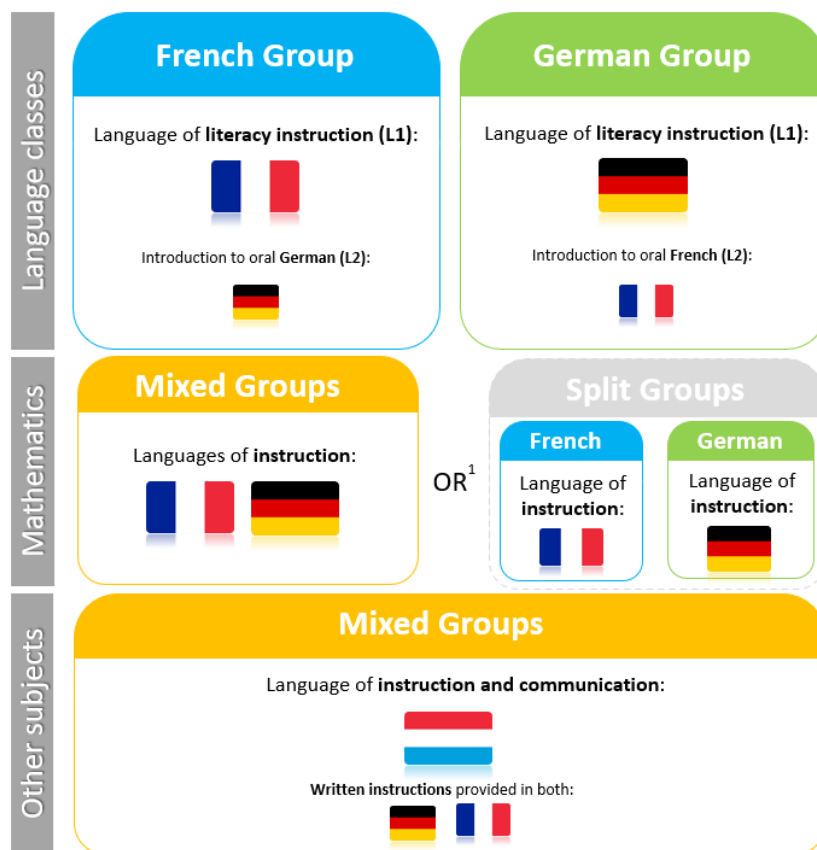
With regard to mathematics, the participating schools are free to decide whether they split their classes into two groups based on the students' respective language of literacy acquisition or whether

mathematics is taught in a mixed group in which both the German and the French languages are used (SCRIPT & MENJE, 2023b).

In order to allow all students to benefit from the linguistic diversity of their classroom and to maintain the traditional trilingualism of the national school system, Luxembourgish is the instruction language in the majority of the other subjects (e.g., introduction to science, introduction to art and culture, living together and values, sports; MENJE, 2023a) with written instructions being offered in both German and French. By separating students only for language-related teaching units and for mathematics (depending on the respective school's decision), the pilot project aims at fostering Luxembourgish as an integration and communication language, and it thus remains an important key factor to facilitate mutual understanding in a plurilingual school population.

Figure 2 illustrates how the three official languages of German, French and Luxembourgish are used within the pilot project "Zesumme Wuessen!" in Cycle 2.

Figure 2 - Overview on the Language Use within Cycle 2 of the Pilot Project



Note. ¹ The schools participating in the pilot project can decide whether to teach mathematics in mixed or split groups (see section 1.2.2).

1.2.3 THE CRITERIA-BASED ORIENTATION OF STUDENTS

Considering the importance of the early school years in the students' language acquisition and in their educational development in general (e.g., Hornung et al., 2023), the literacy pilot project "Zesumme Wuessen!" already starts in *Cycle 1*. During the first year of *Cycle 1* (C1.1), the teachers and other actors of the educational system (e.g., specialised teachers for students with special educational needs, I-EBS) discuss and decide which language of literacy acquisition would be the best choice for each student, basing themselves on a list of criteria that has been elaborated specifically for the orientation process of the students participating in the pilot project (SCRIPT & MENJE, 2023b). The following three guiding categories are thereby being taken into consideration by the pedagogical team:

- **The student's language biography** (e.g., languages spoken at home and in early childcare institutions)
- **The student's oral language competencies** (e.g., language development, potential support within the family)
- **The family's language policy** (e.g., parental expectations regarding the language learning of their child)

Based on these aspects, the teachers make a suggestion to the parents (or legal representatives) and discuss with them in the so-called *bilans* at the end of C1.1 (intermediate reports on the development of competences) which language of literacy acquisition seems to be the most suited for each individual child.

In the second year of *Cycle 1* (C1.2), students that are going to start their literacy acquisition in French in *Cycle 2* are being introduced to the French language in the scope of two to three weekly learning activities that are aiming at fostering early literacy competencies (*premiers pas vers la compréhension de l'écrit et premiers pas vers la production écrite*; SCRIPT & MENJE, 2023b). Similarly, these activities are offered in German to students that are going to pursue their literacy acquisition in German.

Over the whole course of *Cycle 1*, the participating schools are offering a consulting and support system to the parents (or legal representatives) in order to guide them with pedagogical advice in the selection of their child's language of literacy acquisition (SCRIPT & MENJE, 2023b). The final choice remains with the parents (or legal representatives).

1.2.4 SCIENTIFIC SUPPORT AND EVALUATION

As stated in the current government's coalition agreement, the decision whether the offer of a French literacy acquisition should be established alongside the German one at national level needs to be based on scientific evidence (*Le Gouvernement du Grand-Duché de Luxembourg*, 2023). In this context, a scientific council consisting of five (inter)national experts from the fields of multilingualism, large-scale assessment, language learning and education has been introduced with the mission of advising all actors involved in the pilot project regarding aspects such as the development, implementation and general advancement of the pilot project (SCRIPT & MENJE, 2023b).

Additionally, the Luxembourg Centre for Educational Testing (LUCET) of the University of Luxembourg is scientifically evaluating the literacy pilot project “Zesumme Wuessen!” by including the classes of the participating schools in its well-established Luxembourg School Monitoring Programme “Épreuves Standardisées” (ÉpStan). More specifically, a stepwise extension of the ÉpStan allows to monitor the children of the pilot project longitudinally over the course of their educational pathway in primary school (from C2.1 to C4.1) and beyond (7^e to 5^e in secondary education). By assessing academic achievement in selected key domains of learning (German, French, mathematics; Martin et al., 2015) and by collecting self-reported data on additional aspects such as academic motivation (via student questionnaires) and parental support (via parent questionnaires), the ÉpStan² offer an encompassing data base that allows a comprehensive scientific evaluation of the pilot project. The overarching research aim and the specific research questions that are being addressed in the present report will be presented in more detail in the following.

1.3 RESEARCH INTEREST AND RESEARCH QUESTIONS OF THE PRESENT REPORT

Using the representative full-cohort data that was collected in the scope of the ÉpStan in autumn 2023, the present report is aiming at providing a first evidence-based and comprehensive evaluation of the pilot project “Zesumme Wuessen!” by focusing on different dimensions such as the student population’s characteristics, academic achievement, academic motivation and wellbeing, as well as on parental support. With questionnaire data collected from both students and parents (or legal representatives) in primary education, the ÉpStan encompass important information on individual student background characteristics (e.g., gender, SES, language, and migration background). In a first step, the present report thus illustrates the background characteristics of the C2.1 students taking part in the pilot project by answering the following research question in *Chapter 3*:

- How is the C2.1 student population of the pilot project classes composed in terms of **individual background characteristics** and how does it compare to the full cohort of the ÉpStan 2023/24?

Considering that academic achievement is one of the most central academic outcome variables and that both national and international studies have identified significant achievement differences in key school competences (e.g., reading, mathematics) between student groups (e.g., Boehm et al., 2016; Hornung et al., 2021), the present report furthermore analyses how the students participating in the pilot project are performing academically compared to their peers that are not part of the “Zesumme Wuessen!” pilot project. Regarding academic achievement, the following research question is thus being investigated in *Chapter 4*:

² For more information on the measures used in the ÉpStan see section 2.2 of the present report.

- How do the C2.1 students of the pilot project perform in **mathematics**, in **Luxembourgish** (communication language), and in their respective **language of literacy acquisition** (German or French) compared to the full cohort of the ÉpStan 2023/24?

Schools are however not only responsible to teach academic skills but should furthermore be considered as learning environments that foster students' motivation (e.g., academic self-concept and interest) and enable them to develop a positive attitude towards learning in a supportive climate (e.g., class and school climate, teacher-student relationship). In light of a strong consensus in research stating that academic motivation and academic achievement are related to each other (Niepel et al., 2014; Schiefele et al., 2016; Wolff et al., 2021), the present report addresses the following research question in *Chapter 5*:

- How does the pilot project affect the C2.1 students' academic **motivation** (e.g., general and domain-specific academic self-concept, interest and anxiety) and **wellbeing** (e.g., school and class climate) in comparison to the full cohort of the ÉpStan 2023/24?

In addition to the students' academic achievement and motivation, the parents' possibilities to support their child when it comes to learning (e.g., doing homework, preparing for tests) are positively related to academic achievement (Bakker et al., 2007; Boonk et al., 2018). Therefore, the present report aims at understanding how the possibility to offer parental support, which depends (at least to a certain degree) on the parents' own language abilities in the instruction language(s), is perceived by the parents (or legal representatives) of the students participating in the pilot project by investigating the following research question in *Chapter 6*:

- How does the pilot project affect the parents' perception of how they can **support** their child academically based on their own skills in their child's language of literacy acquisition?

By providing results on academic achievement (in mathematics, in Luxembourgish as communication language and in the respective language of literacy acquisition), motivation (e.g., academic self-concept, academic interest), wellbeing (e.g., class climate, teacher-student relationship), and the perceived parental support of C2.1 students participating in the pilot project and by comparing them furthermore to the results of their peers who are not participating in the pilot project, the present report will generate first important insights into whether the broadening of the language offer in the scope of the literacy pilot project "Zesumme Wuessen!" can contribute to encountering the existing educational inequalities of the Luxembourgish education system, whose student population is characterised by a high linguistic diversity.

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THE LUXEMBOURG SCHOOL MONITORING PROGRAMME *“ÉPREUVES STANDARDISÉES”*

MEASURES AND METHODOLOGY TO
EVALUATE THE LITERACY PILOT PROJECT

2. THE LUXEMBOURG SCHOOL MONITORING PROGRAMME "ÉPREUVES STANDARDISÉES"

2.1 GENERAL DESCRIPTION

The "Épreuves Standardisées" (ÉpStan; Martin et al., 2015) are a well-established school monitoring tool in Luxembourg. They consist of standardised achievement tests, which assess academic achievement of primary and secondary school students in selected key areas of education (e.g., mathematics, German, and French). Administered in autumn at the beginning of each new learning cycle in all public and private state-subsidised schools of the country, the ÉpStan allow to systematically monitor whether the education standards (as defined by the Ministry of Education, Children and Youth) of the previous learning cycle have been achieved by all students in their respective grade.

The ÉpStan are administered in the classroom with achievement tests taking approximately 30 to 40 minutes per subject in Cycle 2.1 and 40 to 50 minutes per subject in Cycles 3.1 and 4.1. To allow for an economical and highly standardised assessment, the ÉpStan items are presented in a closed format (e.g., multiple-choice, true-false, or ordering items) or require short answers only (Fischbach et al., 2014).

To ensure a strong test quality, the items included in the ÉpStan standardised achievement tests are developed and compiled by interdisciplinary test development groups that consist of researchers from the ÉpStan team (e.g., expertise in the domains of psychometrics and test development), of teachers actively teaching the different subjects at each respective grade level (e.g., expertise in subject contents and in the educational curriculum), and of members from the Ministry of Education, Children and Youth (e.g., expertise in educational curriculum and in reference documents). Only items that have previously been tested regarding their content, format, and practicability, and validated psychometrically for each grade level in a so-called pretest will be included in the actual ÉpStan achievement tests of the subsequent year(s).

Besides the standardised achievement tests, the ÉpStan entail questionnaires to assess central features of the students' academic motivation (e.g., academic self-concept) and wellbeing (e.g., class climate, teacher-student relationship). In addition, parent questionnaires allow to generate information on the students' individual background characteristics regarding aspects such as the family's language profile, their socio-economic status, and their perception of their possibilities to support their child academically.

In primary school, all standardised achievement tests and the student questionnaire are presented in paper-and-pencil format, whereas secondary school students' complete computer- or tablet-based tests and questionnaires.

2.2 MEASURES USED FOR THE EVALUATION OF THE LITERACY PILOT PROJECT

With the literacy pilot project "Zesumme Wuessen!" having been launched in the participating schools at the C2.1 level at the beginning of the 2023/24 school year, the ÉpStan measures assessed in this specific learning cycle will be used and the relevant measures will be described in more detail in the following.

2.1.1 ACADEMIC ACHIEVEMENT TESTS IN C2.1

In C2.1, student competences are assessed in the key areas of mathematics, listening comprehension and early literacy with each test including tasks that can be allocated to either *Level 1* (corresponding to the *Niveau Socle* of the education standards) or to *Level 2* (corresponding to the *Niveau Avancé*), based on their respective theoretical difficulty. An exception is the listening comprehension test in the literacy acquisition languages German and French. Both languages are not part of the education standards for *Cycle 1* (the previous learning cycle). Consequently, there is no *Niveau Socle* defined for German and French at the end of *Cycle 1*. However, the comprehension of the literacy acquisition language is a key precursor skill for all subsequent academic learning, especially reading (Röthlisberger et al., 2021). Thus, German listening comprehension has been added to the ÉpStan in 2022/23 and French listening comprehension has been added in 2023/24 to assess children in the French literacy classes of the pilot project. Both tests assess two difficulty levels. Items at difficulty level 1 refer to basic comprehension skills relying on easy tasks such as understanding and completing short instructions (e.g., colour the shoes in blue), understanding familiar words (e.g., towel, pencil), and understanding short stories based on familiar topics (e.g., school, friends). Items at difficulty level 2 refer to more detailed information on slightly longer texts and a broader vocabulary.

2.1.1.1 MATHEMATICS

In terms of content regarding primary school, the mathematics achievement test in C2.1 includes tasks assessing the following areas: (a) *space and shapes*, (b) *numbers and operations*, and (c) *measurement*. The ÉpStan mathematics items are presented in either a decontextualised (*specific basic skills*, which are defined as mathematical knowledge and skills that can be applied independently, without any context) or a contextualised (problem solving) way (MENFP, 2011). Noting that Luxembourgish has been the main instruction language in *Cycle 1*, the mathematics achievement test is administered in Luxembourgish to the whole C2.1 student population at the national level and to all students attending a "Zesumme Wuessen!" classroom, irrespective of their language of literacy acquisition. In total, the mathematics achievement test comprised 37 items distributed over two test booklets: 21 level 1 items and 16 level 2 items³.

³ More information on the Mathematics achievement test can be found on the ÉpStan website (<https://epstan.lu/en/assessed-competences-21/>), which also provides sample items (<https://epstan.lu/en/download-area-21/>).

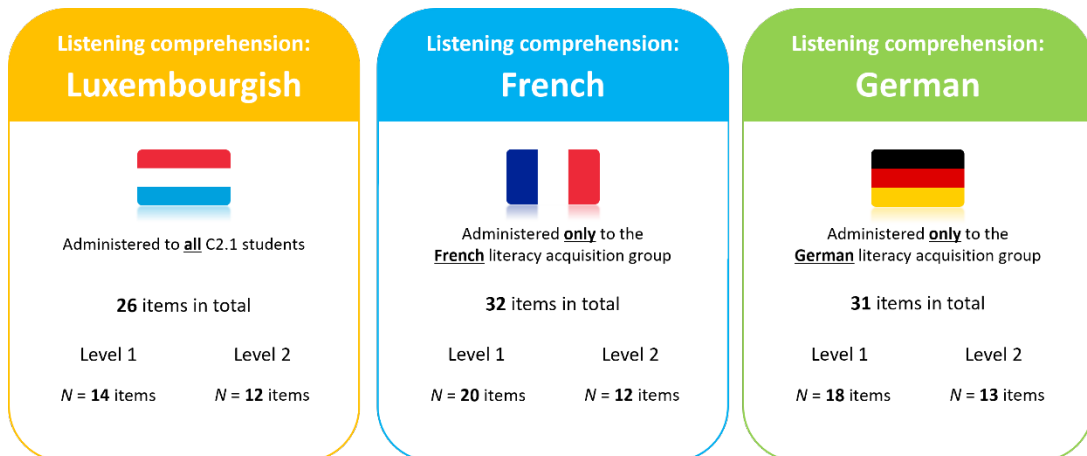
2.1.1.2 LISTENING COMPREHENSION

The standardised ÉpStan listening comprehension achievement tests (Luxembourgish as well as either German or French) are presented to students by the means of an audio file and include tasks assessing the three sub-skills of being able to (a) *complete instructions*, (b) *identify and apply information presented in a text* as well as (c) *construing information and activating listening strategies*. Each test consists of different text forms (e.g., dialogues, tales, and stories) that deal with familiar topics (e.g., family, school, and nature).

Considering that Luxembourgish has been the main instruction language in *Cycle 1* and that many school subjects in *Cycle 2* (e.g., introduction to science, introduction to art and culture, living together and values, sports; MENJE, 2023a) are taught in Luxembourgish to the students participating in the pilot project irrespective of their language of literacy acquisition (see Section 1.2.2), the achievement test in **Luxembourgish listening comprehension** is administered to all the students attending a “Zesumme Wuessen!” classroom.

The students of the pilot project that are learning to read and write in German are furthermore assessed in **German listening comprehension**, whereas their peers that are learning to read and write in French are assessed in **French listening comprehension**. *Figure 3* illustrates which listening comprehension test is taken by which student group and furthermore provides information on the total number of items.

Figure 3 - Listening Comprehension Tests Administered in the C2.1 Classes of the Pilot Project



In the following, the composition of the French listening comprehension test is described and illustrated by the means of a text extract and examples. Basic comprehension skills such as word and sentence comprehension were assessed using vocabulary (e.g., “*Out of the four pictures, choose the picture depicting a table.*”) and short instructions (e.g., “*Colour the shoes in blue!*”). This sub-skill was composed of a total of 15 items: ten items with difficulty level 1 and five items with difficulty level 2.

Text comprehension was assessed by two stories with a total of 17 items. The first story referred to an interaction between two children at school, followed by eight comprehension items, out of which five items assessed difficulty level 1 and three items assessed difficulty level 2. The second story referred to an interaction between a child and her grandfather repairing a swing in the garden, followed by nine comprehension items, out of which five items corresponded to difficulty level 1 and four items to difficulty level 2. At difficulty level 1, the items measured basic information on the characters (e.g., "Who is talking?"), on the location where the story is taking place (e.g., in the garden) and the context or activity (e.g., repairing a swing). At difficulty level 2, the items assessed the comprehension of more detailed information or the interpretation of the situation, for instance the main characters' names, their favourite game or emotional state.

Figure 4 – Example of French Listening Comprehension Items (Dialogue)


Example: La balançoire


Text extract:
 Clara est de mauvaise humeur, elle murmure : Oh non ! C'est cassé ! Papy, viens voir !
 Papy de loin : Attends Clara ... Je range mes outils de jardin et j'arrive.
Bruit d'affaires rangées de côté et bruits de pas qui se rapprochent.
 Papy : Alors qu'est-ce qui se passe Clara ?
 Clara : Regarde la balançoire ... elle est cassée.
 Papy : Ah oui, je vois.
 Clara : Tu peux la réparer ?
 Papy : ... Hmm ... la corde a craqué. Pour la réparer, nous avons besoin d'une nouvelle corde.
Petit silence de réflexion.
 Papy : Peut-être que j'en ai une dans la cave. Allons voir.
 Clara : Je viens avec toi.
Bruits de pas qui descendent les escaliers.
 ...


Example of a difficulty level 1 item:


11 🔍

Qu'est-ce qui est cassé ? Coche la bonne image.









- Le toboggan
- Le vélo
- La balançoire
- Le ballon

Example of a difficulty level 2 item:

12 🔍

Entoure la bonne réponse. La fille s'appelle ...

1

2

3

4

- 1) Louise
- 2) Amy
- 3) Inès
- 4) Clara

In total, the French listening comprehension test comprised 32 items: 20 items at difficulty level 1 and 12 items at difficulty level 2. The German listening comprehension test consisted of a total of 31 items: 18 items at difficulty level 1 and 13 items at difficulty level 2 (see Figure 3 for details).

2.1.1.3 EARLY LITERACY

As for listening comprehension, the standardised ÉpStan achievement test in C2.1 aiming to assess early literacy is presented to the students by the means of an audio file. It was primarily designed to measure the students' ability of constructing and using written language units, and is divided into the three sub-skills of (a) *phonological awareness* (e.g., identifying the initial sound of a word, rimes and syllables), (b) *visual discrimination* (e.g., identifying words or differences between pictures), and (c)

comprehension of the alphabetic principle (e.g., letter knowledge, writing or identifying the first letter of a familiar word).

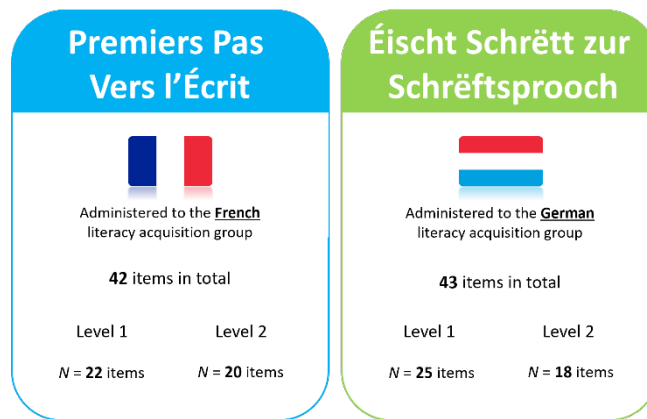
Considering that the pilot project “Zesumme Wuessen!” already starts in *Cycle 1* (C1.2) by introducing the students to their respective language of literacy acquisition in the scope of two to three weekly learning activities that are aiming at fostering early literacy competences in either French or German (see Section 1.2.2), it seems coherent to assess the students’ early literacy competence in C2.1 in their language of literacy acquisition.

Therefore, an ÉpStan test assessing early literacy competence in French (**Premiers Pas vers l’Écrit**) has been developed. This newly developed test has been piloted in a pretest to evaluate the feasibility of the developed items in French (see Section 2.1) in the 2022/23 school year. In particular, the test has been pretested in a C2.1 classroom at the Nelly Stein Schoul where the pilot project “Zesumme Wuessen!” had been launched ahead of the other participating schools (see Section 1.2.1), as well as in a French language section classroom of an International Public School. In the 2023/24 school year, the early literacy competence test in French (**Premiers Pas vers l’Écrit**) has in turn been administered to the students of the pilot project that are learning to read and write in French.

Whereas it would have been scientifically more sound to administer an early literacy competence test in German to the students of the pilot project whose language of literacy acquisition is German, such a test has not been developed at this point. Indeed, the extension of the ÉpStan is foreseen to occur stepwise over the next years. Although implying a statistical and methodological limitation, the already existing ÉpStan test assessing early literacy competence in Luxembourgish (**Éischt Schrëtt zur Schrëftsprooch**) has been administered to the students of the pilot project that are learning to read and write in German. With Luxembourgish being the main instruction language in *Cycle 1* for all the children (irrespective of their language of literacy acquisition), and based on international research indicating that early literacy skills appear to transfer across alphabetic languages (Goodrich et al., 2013; Hammer et al., 2014), testing the students learning to read and write in German by the means of the available early literacy test in Luxembourgish might allow to gain at least partial insights into their early literacy competence. A German early literacy competence test (**Erste Schritte zur Schriftsprache**) is foreseen to be piloted in the upcoming ÉpStan data collection in autumn of the 2024/25 school year.

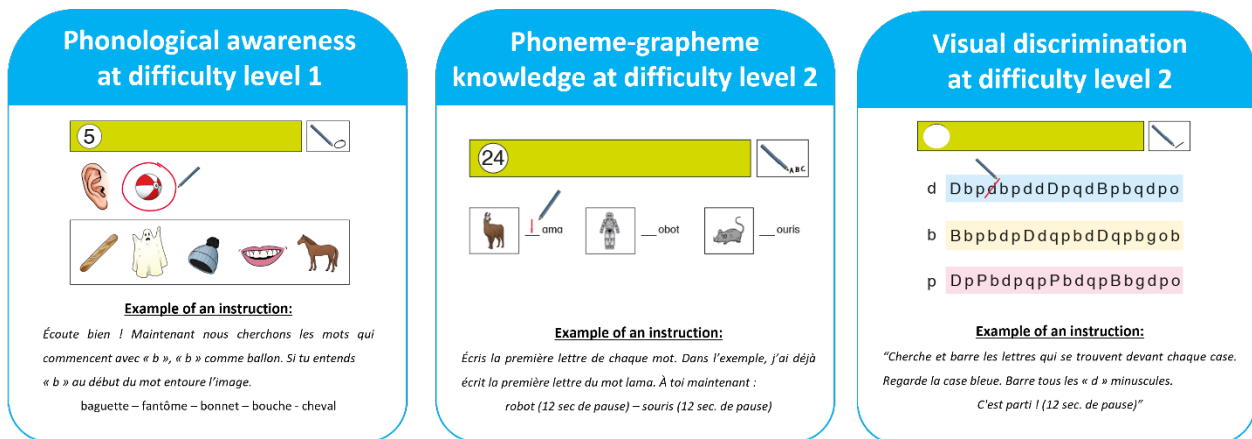
Figure 5 gives an overview of which early literacy competence test is taken by which student group and furthermore provides information on the total number of items as well as on the number of items at difficulty level 1 and difficulty level 2 of each test, respectively.

Figure 5 - Early Literacy Competence Tests Administered in the C2.1 Classes of the Pilot Project



The early literacy competence test in French comprised a total of 42 items: 22 at difficulty level 1 and 20 at difficulty level 2. These items assessed, for instance, phonological awareness (e.g., identifying rimes, initial sound of words, and syllables) referring to difficulty level 1 and phoneme-grapheme association (e.g., writing the first letter of a word) referring to difficulty level 2. Several items assessed visual discrimination (e.g., identifying specific letters or shapes) at both level 1 and 2. Figure 6 shows example items from the French early literacy competence test.

Figure 6 - Examples of French Early Literacy Items



The competence test in Luxembourgish early literacy comprehension comprised a total of 43 items: 25 items at difficulty level 1 and 18 items at difficulty level 2. In line with the early literacy comprehension test in French, these items assessed phonological awareness (e.g., identifying initial sound of words and rimes) at difficulty level 1 and phoneme- grapheme association (e.g., writing the first letter of a word) at difficulty level 2. Several items assessed visual discrimination (e.g., identifying specific letters or shapes) at both difficulty levels 1 and 2.

2.1.2 STUDENT QUESTIONNAIRE

Considering that schools are not only responsible to teach academic skills but should furthermore be fostering students' academic motivation within a supportive learning environment, the ÉpStan are designed to assess motivational aspects and student wellbeing with a self-report student questionnaire. In the C2.1 student questionnaire, various statements such as "*I am interested in most school subjects*" are presented to the students who are invited to express their level of agreement with each item on a two-point Likert scale using age-appropriate shaking heads as symbols for either agreement (yes) or disagreement (no). The student questionnaire is available on the ÉpStan website⁴.

In C2.1, the following three **motivational constructs**, that have repeatedly been found to be associated with academic achievement (e.g., Caviola et al., 2022; Jansen et al., 2016; Wu et al., 2021) are being assessed in the student questionnaire:

(a) **General and domain-specific academic self-concept:**

Academic self-concept can broadly be defined as the entirety of cognitive representations an individual has regarding its own academic abilities and it evolves based on the attitudes, experiences, feelings, and beliefs a student gathers on its academic abilities in the educational context (e.g., Brunner et al., 2009; Gogol et al., 2016; Hoferichter et al., 2018). In C2.1, two items are designed to assess the students' general academic self-concept (e.g., *I am good at most school subjects*). In addition, two items are aiming at measuring the domain-specific self-concept per subject in both mathematics and the students' respective language of literacy acquisition (e.g., *I learn things quickly in French*).

(b) **General and domain-specific academic interest:**

Academic interest describes the personal importance and emotional value towards a topic, idea or school subject resulting in a relatively enduring preference for and predisposition to (re-)engage with the content of interest (e.g., Gogol et al., 2016; Hidi & Renninger, 2006; Krapp, 2002). In the C2.1 student questionnaire, one item is assessing the students' general interest (e.g., *I enjoy most school subjects*). Regarding domain-specific academic interest, one item per school subject is assessing the students' academic interest in mathematics as well as in the respective language of literacy acquisition (e.g., *I enjoy French*).

(c) **General and domain-specific academic anxiety:**

Academic anxiety describes the students' cognitive, physiological and behavioural responses (e.g., worry, stress, or avoidance) related to situations in the educational context such as, for example, the extent to which students are afraid of a specific school subject, how much it

⁴ <https://epstan.lu/en/cycle-21-en/>

worries them, or in how far exams in the subject are making them nervous (e.g., Carey et al., 2017; Fishstrom et al., 2022). As for academic interest, one item is assessing students' general academic anxiety in C2.1 (e.g., *I am afraid of most school subjects*) and one item per subject is designed to assess domain-specific academic anxiety in mathematics and in the respective language of literacy acquisition (e.g., *I am afraid of French*).

Besides these motivational variables, the ÉpStan student questionnaire is measuring **student wellbeing**, which has also repeatedly been found to be related to academic achievement (e.g., Praetorius et al., 2018; Wollschläger et al., 2022) by the means of the following four constructs in C2.1:

(a) **General school satisfaction:**

The construct of school satisfaction describes the subjective cognitive appraisal a student does with regard to the quality of their school life (Baker et al., 2003) and is measured by the means of three items (e.g., *I am happy when I am at school*).

(b) **Teacher-student relationship:**

Tapping into the student support dimension of instructional quality (Praetorius et al., 2018), one item is aiming at assessing whether students receive support from their teacher if needed (e.g., *In my class, I get extra support from my teacher when I need it*).

(c) **Class climate:**

Besides the relationship between the teacher and the students, the interaction between peers is important for the students' wellbeing. Therefore, the class climate is measured by two items (e.g., *In my class, we help each other*).

(d) **Tendency for disruptions:**

In addition to student support, classroom management is a generic dimension of instructional quality (Praetorius et al., 2018) and entails aspects such as the tendency for disruptions within a class that relate to whether the learning environment allows all students to learn without being disturbed. In the C2.1 student questionnaire, the tendency for disruptions is assessed via one item (e.g., *In my class, we sometimes disrupt the class on purpose*).

2.1.3 PARENT QUESTIONNAIRE

To gather additional information on the socioeconomical, sociocultural and linguistic background of each student that cannot be reliably assessed through the student questionnaire, the parents (or legal representatives) of students at the primary school level are invited to respond to a parent questionnaire, which is presented in four languages (German, French, English and Portuguese).

Besides questions on the family's socioeconomic status (e.g., professional occupation of the parents, level of their qualifications), their sociocultural origins (e.g., country of birth) and on the child's linguistic profile (e.g., languages spoken in early childcare, within the family, among friends and when watching movies, listening to audios or reading stories), the parent questionnaire includes a section on the parents' perceptions of the multilingualism in Luxembourg's education system.

Whereas two items are designed to assess the parents' general perception of multilingualism (e.g., *The multilingualism of the schools in Luxembourg offers our child good future opportunities*), two items are interested in understanding how parents perceive their own and the teachers' role in supporting their child academically (e.g., *It is our task as parents/legal representatives to support our child in their school learning*). In addition, five items are measuring to what extent the parents' own language skills allow them to support their child academically regarding aspects such as communication with teachers (e.g., *Our language skills allow us to have an exchange with our child's teacher, for example, during Bilan talks or parents' evenings*) and academic support in literacy acquisition, mathematics and homework (e.g., *Our language skills in our child's language of literacy acquisition allow us to support our child in learning how to read and write*). All these statements are presented to the parents on a 4-point Likert scale (ranging from "does not apply" to "does apply") and parents are invited to express their level of agreement with each item.

Based on this section of the parent questionnaire, a deeper understanding of whether the broadening of the language offer via the literacy pilot project relates with the perceived possibility to offer parental support, which is (at least partially) depending on the parents' own language abilities in the instruction language(s), becomes possible.

2.1.4 TEACHER QUESTIONNAIRE

In addition to the ÉpStan measures that are traditionally focusing on students and their parents, other important actors in the scope of the literacy pilot project are the teachers at the participating schools as they are implementing the pilot project and interacting with the students (and parents) on a daily basis.

Therefore, the eight C2.1 teachers from all four schools, as well as the two C2.2 teachers from the Nelly Stein Schoul, in which the pilot project had been launched ahead of the other participating schools (see Section 1.2.1), were invited to complete a teacher questionnaire.

The first part of the questionnaire consists of statements tapping into different domains related to the pilot project such as, for example, organisational aspects (e.g., *I consider the regular exchange with colleagues who are also taking part in the pilot project helpful for the preparation of my own teaching lessons*), the perceived impact of the pilot project on educational inequalities (e.g., *The pilot project contributes to reducing educational inequalities between children*), the interaction with parents (e.g.,

The pilot project motivates parents (or legal representatives) to participate regularly in everyday school life, for example at parents' evenings or in projects) as well as the students' academic development (e.g., The pilot project fosters student participation in class). As in the parent questionnaire, these statements were presented on a 4-point Likert scale (ranging from "does not apply" to "does apply") and teachers were asked to express their level of agreement with each statement.

In the second part of the questionnaire, teachers were asked to provide short answers to seven open text field questions on their perception of first successes and challenges that they were able to observe since the start of the school year, on feedback they have received from parents and students regarding the pilot project, and on the didactical material they are using in the subjects of French, German, and mathematics.

2.1.5 STUDENT BACKGROUND VARIABLES

Via the student and parent questionnaires, the ÉpStan take into account gender, socioeconomic, sociocultural and linguistic student background characteristics that were proven to have an important impact on educational success in national and international studies (e.g., Agirdag & Vanlaar, 2016; Duong et al., 2016; Hornung et al., 2021; Sirin, 2005; Sonnleitner et al., 2021; Voyer & Voyer, 2014).

Regarding family socioeconomic status (**SES**), the *International Socio-Economic Index of Occupational Status* (ISEI, Ganzeboom, 2010; Ganzeboom et al., 1992) is used to classify a student's SES based on the professional occupation of the parents. The ISEI values range from 10 (e.g., kitchen helpers) to 89 (e.g., medical doctors). Within ÉpStan, the highest available ISEI value (HISEI) of either the father or the mother (or of the child's legal representative) is considered. Looking at **migration background**, students are considered as natives when the students themselves and at least one of their parents were born in Luxembourg. To compare students based on their languages, students are considered to have a specific **language background** when they speak the respective language with at least one of their parents at home. As displayed in several national studies and key figures (e.g., *Figures I.13 and I.14* in LUCET & SCRIPT, 2023), Luxembourgish/German, French, and Portuguese were identified as the language groups that are the most frequent in the Luxembourgish school population, and the present report thus focuses on those three language groups. To avoid a ranking of different languages, one student can be found in more than one language group within the ÉpStan (e.g., students speaking Luxembourgish with their mother and Portuguese with their father are considered to have both a Luxembourgish and Portuguese language background). With regard to **gender**, the student administrative database of the Ministry of Education, Children and Youth has been used.

2.3 METHODOLOGY USED FOR THE EVALUATION OF THE LITERACY PILOT PROJECT

2.3.1 CREATION OF COMPARABLE STUDENT GROUPS VIA PROPENSITY SCORE MATCHING

As described in more detail in section 1.2.1, the schools participating in the pilot project were selected according to different criteria (e.g., size of the municipalities, composition of the student population regarding aspects such as language and migration background) allowing an implementation of the pilot project in highly diverse school contexts (SCRIPT & MENJE, 2023b). In line with results from the STATEC's demographic atlas analysing the demographic characteristics of the country's population at the level of the municipalities (STATEC, 2019), *Table 1* of the present report shows that the students from the four schools participating in the pilot project differ considerably in their student background characteristics (e.g., SES, migration and language background) from their peers at the national level.

In order to nevertheless allow valid comparisons between different student groups, the well-established statistical method of **propensity score matching** was used in order to compute reference groups, which include students whose individual background characteristics are comparable to those of the students who are taking part in the pilot project. In study designs where a randomisation (i.e., a random allocation of students to the pilot project) is impossible due to ethical aspects (e.g., parents having the choice to select their child's language of literacy acquisition), and where the treatment group (i.e., the students participating in the pilot project) differs from the control group (i.e., their peers at the national level) due to student background characteristics which increase the likelihood of students to be selected for treatment (e.g., having French or Portuguese language backgrounds), the method of propensity score matching allows to statistically control for such differences in baseline covariates (e.g., Kane et al., 2020; Langworthy et al., 2023; Zhao et al., 2021). By taking into consideration the individual student background characteristics of gender, SES, migration and language background, a so-called propensity score was computed for each C2.1 student participating in the ÉpStan 2023/24 expressing the student's probability of being allocated to the treatment group based on the selected covariates (i.e., individual student background characteristics). Using this propensity score, each individual from the treatment group is matched with one or more of the individuals from the control group displaying the closest possible propensity scores (the so-called nearest neighbour matching, which allows to identify a "statistical twin" for each participant; Zhao et al., 2021). Due to the fact that the number of individuals that can be meaningfully matched depends on the size of the available control group (Kane et al., 2020), the full-cohort ÉpStan data at the national level ($N = 5824$) allowed to match a total of five students who are not taking part in the pilot project (control group) to each of the students taking part in the pilot project (treatment group).

The findings presented in the present report are thus differentiating between the following five student groups:

(a) **ALPHA-French group:**

The ALPHA-French group consists of $N = 48$ students from the four schools participating in the pilot project whose parents have opted for a literacy acquisition in French.

(b) **ALPHA-French reference group:**

Using propensity score matching as described in more detail above (i.e., nearest neighbour matching), five students were matched to each of the 48 students from the ALPHA-French group, resulting in a total of $N = 240$ students whose individual background characteristics (i.e., gender, SES, migration and language background) are comparable to those of the ALPHA-French group (e.g., high share of students speaking French and/or Portuguese at home). Although comparable when it comes to the individual background characteristics, it has to be underlined that the students from the ALPHA-French reference group completed the ÉpStan achievement tests assessing listening comprehension in German as well as early literacy skills in Luxembourgish, whereas the ALPHA-French group completed both tests in French, their language of literacy acquisition (see 2.1.1.2 and 2.1.1.3 for details on the test administration and 2.3.3 for details on comparability of results).

(c) **ALPHA-German group:**

The ALPHA-German group consists of $N = 65$ students from the four schools participating in the pilot project who are learning to read and write in German.

(d) **ALPHA-German reference group:**

In line with the procedure described for the ALPHA-French reference group, five students were matched to each of the 65 students from the ALPHA-German group, resulting in $N = 325$ students whose individual background characteristics (i.e., gender, SES, migration, and language background) are comparable to those of the ALPHA-German group (e.g., high share of students speaking Luxembourgish and/or German at home).

(e) **Regular group at the national level:**

To put the results of the students taking part in the literacy pilot project into perspective, the present report furthermore communicates the findings at the national level. This group consists of all $N = 5824$ students following the Luxembourgish curriculum (i.e., German literacy acquisition in regular classrooms). The regular group at the national level thus includes the $N = 240$ students of the ALPHA-French reference group as well as the $N = 325$ students of the ALPHA-German reference group.

2.3.2 REPORTING OF THE ÉPSTAN ACHIEVEMENT RESULTS BY DIFFICULTY LEVEL

In order to provide meaningful insights into educational trends (e.g., longitudinal development of the student's academic achievement over time) and in line with well-established international large-scale assessments (e.g., PISA; OECD, 2018), the results of the ÉpStan achievement tests are generally being reported by the means of one global score for each competence domain (e.g., mathematics), which is normed in such a way that the mean value for all students of a certain grade in Luxembourg lies at 500 points with a standard deviation of 100 points in a reference school year (usually the first year the respective competence was assessed in the respective grade; Fischbach et al., 2014).

Considering that a certain sample size is required in order to validly scale the results of an academic achievement test on this so-called ÉpStan metric and that only $N = 48$ students (ALPHA-French group) completed the two French achievement tests (listening comprehension and early literacy), it was not possible to scale these tests in the same way as the other ÉpStan achievement tests (e.g., Luxembourgish listening comprehension, mathematics), which are taken by the full cohort of students ($N = 5824$) attending C2.1.

Although it would have been possible to report the results for the ÉpStan academic achievement tests that were taken by the full cohort of students at the national level, as well as by the ALPHA-German group (i.e., mathematics, listening comprehension in Luxembourgish and German, and early literacy test) on the ÉpStan metric, the present report is presenting the results for all achievement tests by their respective level of theoretical difficulty (i.e., level 1 corresponding to the *Niveau Socle* and level 2 corresponding to the *Niveau Avancé* as defined in the national education standards; MENFP, 2011) to ensure a better comparability.

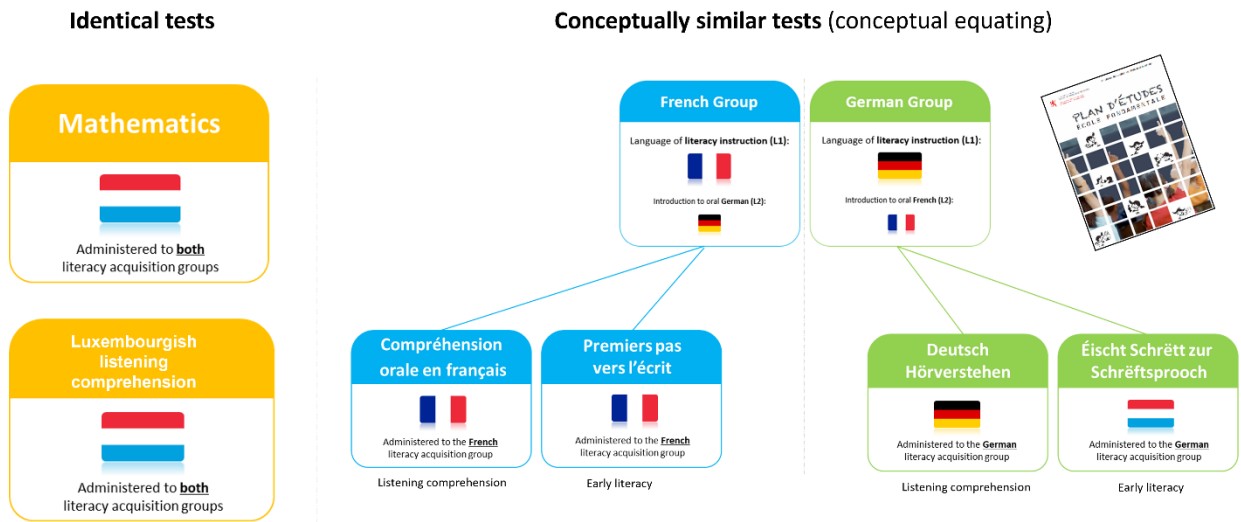
2.3.3 COMPARABILITY OF RESULTS AND CONCEPTUAL EQUATING

As explained in more detail in section 2.2.1, the ÉpStan achievement test in mathematics as well as in Luxembourgish listening comprehension were completed by all C2.1 students of the 2023/24 cohort irrespective of whether they took part in the pilot project or not. As a consequence, the results are directly comparable between student groups – with the caveat that some additional psychometric analyses commonly performed to formally test comparability (measurement invariance) could not be carried out due to the very small number of students enrolled in the pilot project.

In contrast, the tests assessing listening comprehension and early literacy differed depending on the language of literacy acquisition (French for the ALPHA-French group, German and Luxembourgish for the ALPHA-German group and for students at the national level). Thus, the achievement results of the ALPHA-French group in the two French tests (i.e., listening comprehension in French, *Premiers Pas vers l'Écrit*) are **not directly comparable** to the results of the groups (b) to (e) as described in section 2.3.1. However, we implemented a **conceptual equating** between the academic achievement tests across

the two languages of literacy acquisition. This means that the same reference documents were used for the development of all the tests (i.e., *Plan d'Études*; MENFP, 2011) and that the tests were developed using the same procedures (e.g., in teams consisting of interdisciplinary experts, see 2.1 for details). *Figure 7* provides a visual overview on which tests are identical and thus directly comparable and for which tests a direct comparability remains limited (i.e., conceptual equating).

Figure 7 – Comparability of Results



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RESULTS:

THE STUDENT POPULATION OF THE LITERACY PILOT PROJECT

*HOW IS THE STUDENT POPULATION COMPOSED IN TERMS
OF INDIVIDUAL BACKGROUND CHARACTERISTICS?*

3. THE STUDENT POPULATION OF THE LITERACY PILOT PROJECT

With questionnaire data collected from students and their parents (or legal representatives) at the primary school level, the ÉpStan encompass important information on individual student background characteristics (e.g., gender, SES, language, and migration background). In a first step, the present report provides an overview on how the C2.1 student population of the pilot project classes is composed in terms of individual background characteristics (ALPHA-French and ALPHA-German group) and how it compares to the two reference groups as well as to the full cohort of the ÉpStan 2023/24 at the national level.

3.1 INDIVIDUAL STUDENT BACKGROUND CHARACTERISTICS

The results presented in this report are based on representative cross-sectional data from the full cohort of the ÉpStan 2023/24, including all C2.1 students following the Luxembourgish curriculum ($N = 5824$) and $N = 113$ students taking part in the literacy pilot project. As it can be seen in *Table 1*, within the pilot project, $N = 65$ students are learning to read and write in German (ALPHA-German group) and $N = 48$ in French (ALPHA-French group). Although the ÉpStan are currently being extended to the International Public Schools, students from these schools are following a different curriculum (e.g., European curriculum) and have, for comparability reasons, been excluded from the sample of the present report. *Table 1* offers an encompassing overview on the sociodemographic background characteristics of the five student groups presented in the subsequent result chapters (see 2.3.1 for details).

When looking at individual student background characteristics such as for example socio-economic status (SES; expressed as HISEI in *Table 1*) and migration background (percentage of native students), it becomes apparent that the ALPHA-French and the ALPHA-German group taking part in the literacy pilot project are both considerably differing from their peers at the national level. With a mean HISEI value of 42 (ALPHA-French group) and of 44 (ALPHA-German group), the student population taking part in the pilot project is ranging approximately 10 points below the mean HISEI of their peers following the regular curriculum at the national level. Similar differences can be observed when looking at the share of native students (15 %) and of students with a Luxembourgish/German language background (17 %) in the ALPHA-French group compared to a considerably higher share (i.e., 40 % and 42 %, respectively) at the national level.

Considering that both national and international research studies have repeatedly indicated that background characteristics such as gender (e.g., Boehm et al., 2016; Voyer & Voyer, 2014), SES (e.g., Brunner, 2006; Sirin, 2005), migration as well as language background (e.g., Agirdag & Vanlaar, 2016; Muller et al., 2014; OECD, 2016) are related to academic achievement, two reference groups were computed by the means of propensity score matching (see 2.3.1 for more details on the statistical

procedure), whose individual background characteristics are more similar to the ALPHA-French and the ALPHA-German group (see Table 1), allowing more valid statistical comparisons.

Regarding the language background, the ALPHA-French group is characterised by a higher share of students speaking French (29 %) and/or Portuguese (46 %) with at least one of their parents (or legal representatives) at home, while the students in the ALPHA-German group predominantly speak Luxembourgish and/or German (42 %) at home. Looking at the example of the ALPHA-French group, this can be considered as an indication that the criteria-based orientation of students taking part in the literacy pilot project (see 1.2.3 for more details) seems to result in a closer match between their language of literacy acquisition and their home language(s) in comparison to the students from the ALPHA-French reference group with a French (27 %) or Portuguese (52 %) language background, who are learning to read and write in German, which is linguistically more distant from their home language(s).

Table 1 – Detailed Sample Description of the ÉpStan Cohort for the 2023/24 School Year

	N	HISEI (M)	% female	% natives	Language background		
					% Lux/German	% French	% Portuguese
"Zesumme wuessen!"							
ALPHA-French group	48	42	56 %	15 %	17 %	29 %	46 %
ALPHA-German group	65	44	43 %	42 %	42 %	11 %	29 %
Regular curriculum							
ALPHA-French reference group	240	43	56 %	13 %	17 %	27 %	52 %
ALPHA-German reference group	325	43	47 %	40 %	43 %	10 %	24 %
National level	5824	51	48 %	40 %	42 %	21 %	23 %

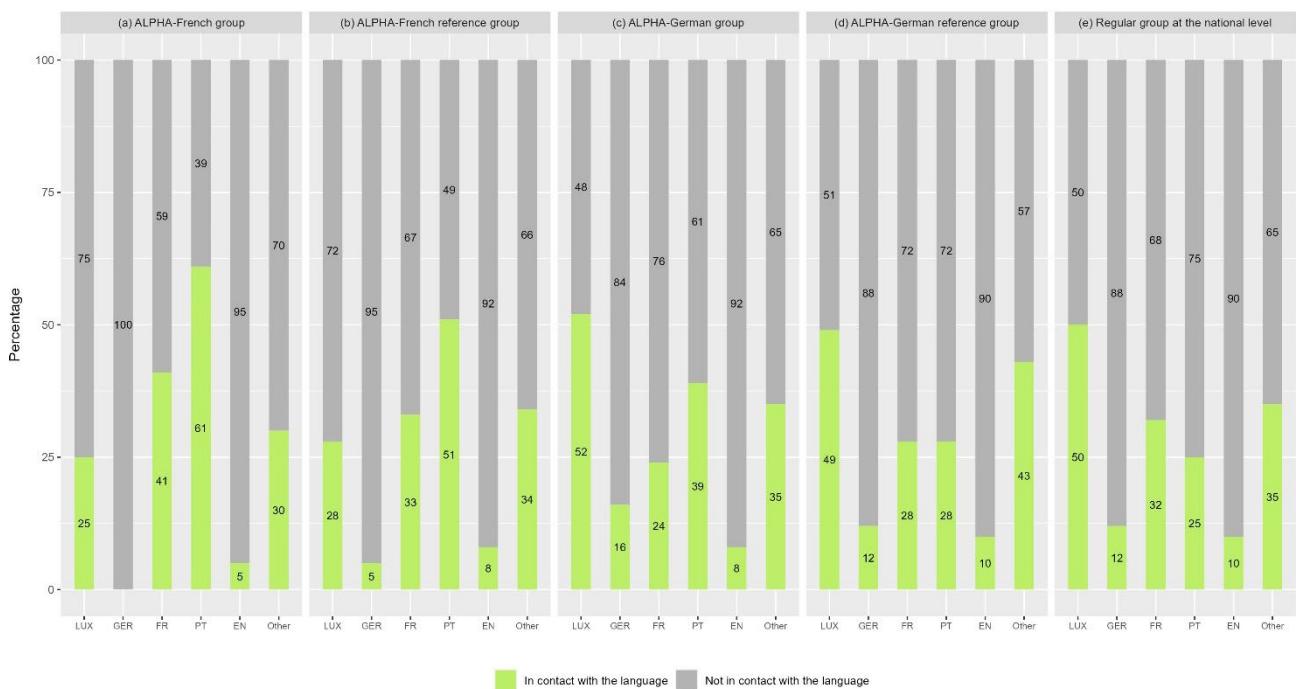
Note. N = Number of students. HISEI = Highest international Socio-Economic Index of Occupational Status. For details regarding the operationalisation of student background variables, see section 2.1.5.

3.2 STUDENTS' CONTACT WITH SELECTED LANGUAGES IN DIFFERENT CONTEXTS

In Luxembourg, the multilingual school and family contexts result in the fact that students are in contact with different languages in various situations. In 2023/24, the ÉpStan parent questionnaire (see 2.1.3 for details) investigated home language activities of C2.1 students by asking parents to indicate with which languages their child comes in contact within the family, with friends, and in the context of media use (i.e., stories, audio plays and movies). With the options of Luxembourgish, German, French, Portuguese, English and other languages, the parents were invited to indicate all the languages with which their child comes in contact on a regular basis.

Figure 8 illustrates the language contact within the family for the five student groups of interest in the present report (see 2.3.1 for more details). The green bars express the percentage of students who are in contact with a certain language, whereas the grey bars are indicating the share of students who are not in contact with a certain language on a regular basis. Looking at the ALPHA-French group, Portuguese and French can be identified as the two languages that the students were most prominently in contact within the family (61 % and 41 %, respectively). With Luxembourgish and German on the other hand, students from the ALPHA-French group are less frequently in contact within the family (25 % and 0 %, respectively). The same pattern can also be observed for the ALPHA-French reference group. In both the ALPHA-German and its reference group, Luxembourgish is the language that students are predominantly in contact with in the family context with 52 % and 49 %, respectively. As it can be seen in Figure 8, these two groups are more comparable to the students at the national level reflecting the highly diverse language profiles of the student population that is characteristic for Luxembourg.

Figure 8 – Language Contact within the Family Expressed in Percentages

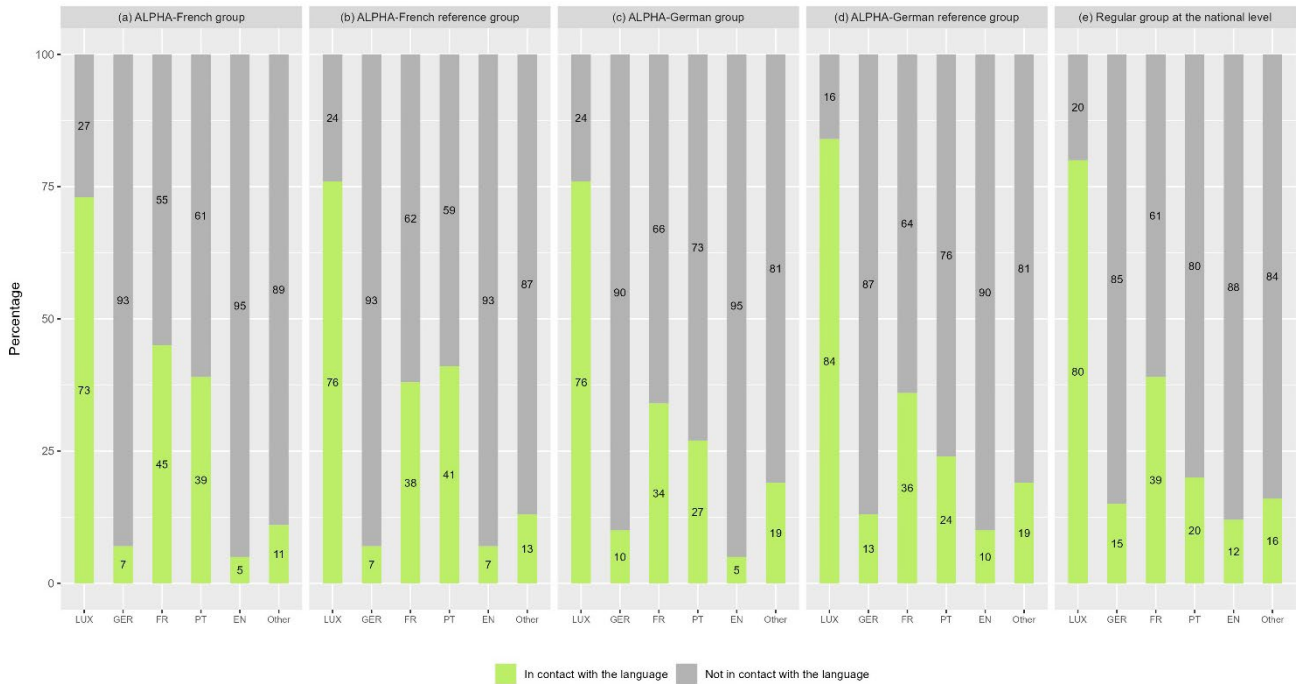


Note. LUX = Luxembourgish. GER = German. FR = French. PT = Portuguese. EN = English. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan parent questionnaire, see section 2.1.3.

Looking at the students' language contact with their friends, Figure 9 shows that Luxembourgish is the language with which students of all five groups are the most frequently in contact on a regular basis (ranging from 73 % in the ALPHA-French group to 84 % in the ALPHA-German reference group). This high prevalence indicates that Luxembourgish functions as the main communication language between students of different language backgrounds, irrespective of whether they are participating

in the pilot project or following the regular Luxembourgish curriculum. Of note, the finding that 73 % of the ALPHA-French students are regularly using the Luxembourgish language when in contact with their friends also seems to be in line with the perception of the C2.1 and C2.2 teachers of the four schools participating in the pilot project, out of which 89 % (rather) agree that the pilot project fosters Luxembourgish as a communication language.

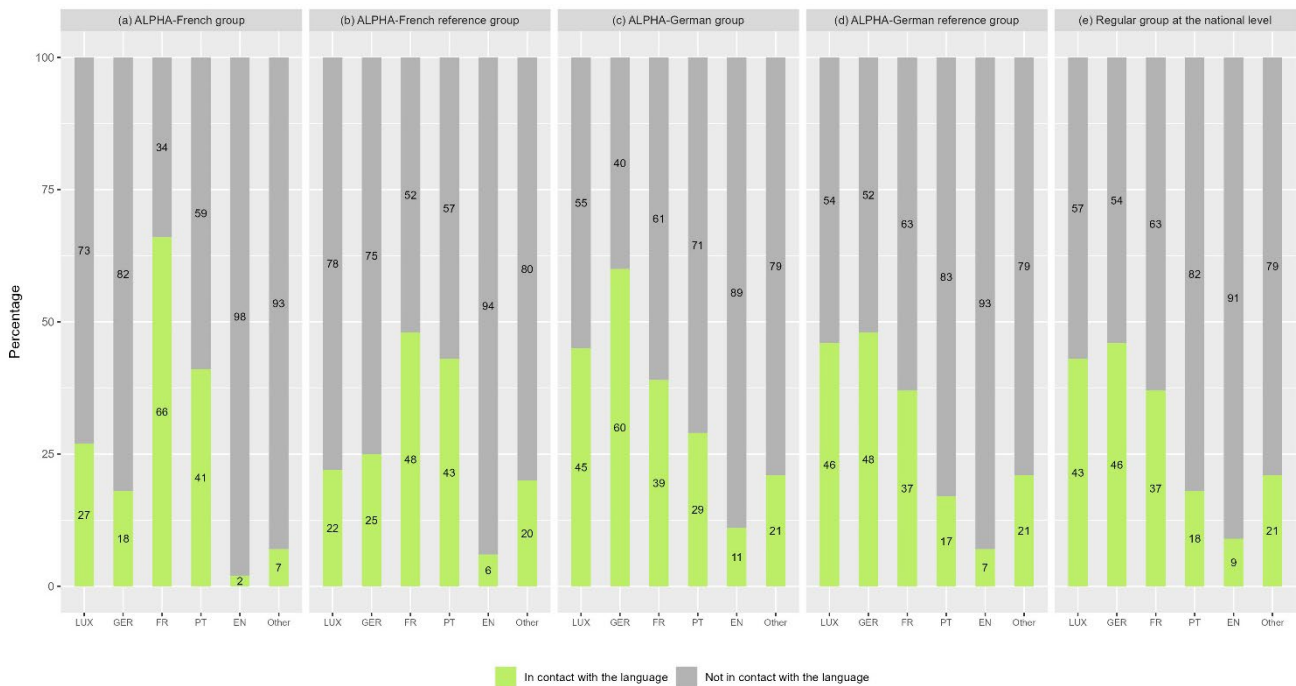
Figure 9 – Language Contact with Friends Expressed in Percentages



Note. LUX = Luxembourgish. GER = German. FR = French. PT = Portuguese. EN = English. For more information on the five student groups, see section 2.3.1 and for more information on the *ÉpStan* parent questionnaire, see section 2.1.3.

With regard to the context of media use, *Figure 10* focuses on the languages, in which stories are told or read aloud to the students. In line with the languages that students are predominantly in contact within the family (see *Figure 8*), students of the ALPHA-French group are mainly being told stories in French (66 %) and Portuguese (41 %), whereas Luxembourgish (27 %) and German (18 %) are less frequently used by the parents. Although French is less predominantly used (48 %) in the ALPHA-French reference group, a similar pattern of results can overall be observed. By contrast, German (60 %) and Luxembourgish (45 %) are predominantly used as the languages of storytelling in the ALPHA-German group. Despite German being less predominantly used (48 %) than in the ALPHA-German group, a very similar pattern of language use when it comes to storytelling can be observed for the ALPHA-German reference group. Considering that parents have to rely on their own language skills to read aloud or tell a story to their child, it does not seem surprising that the findings depicted in *Figure 10* reflect the language(s) that the children are most frequently in contact within the family (see *Figure 8*).

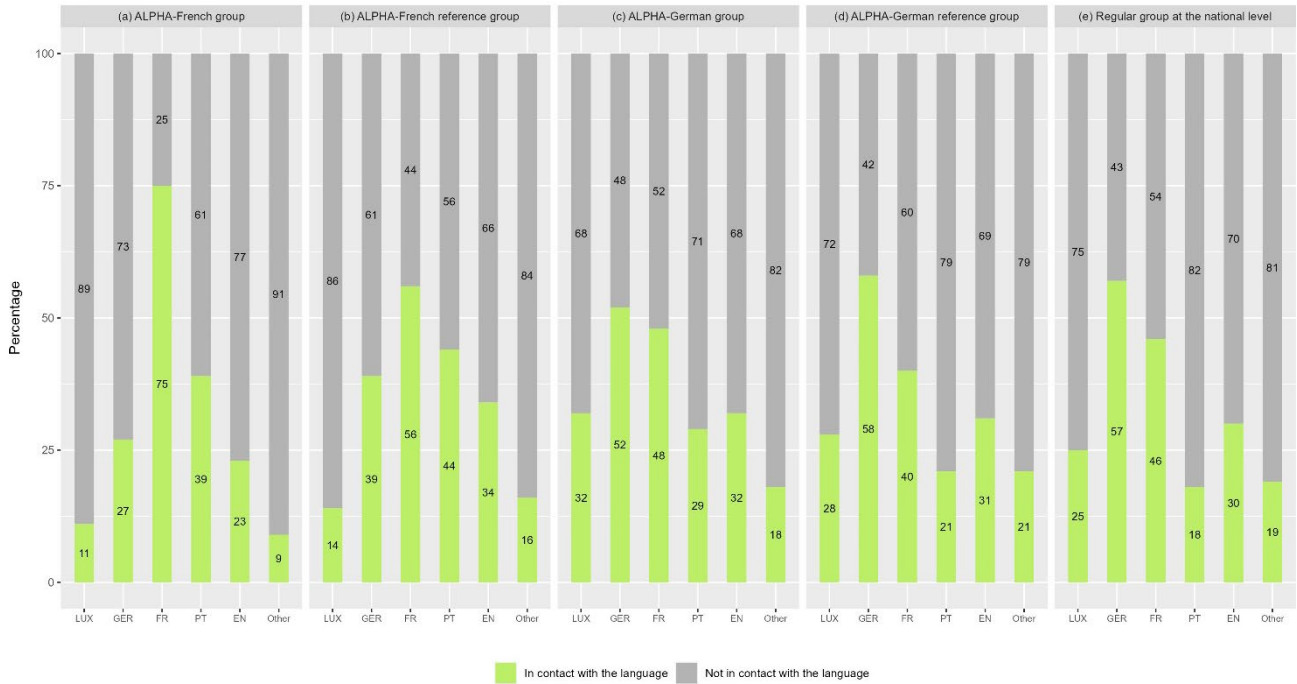
Figure 10 – Language Contact in the Context of Media Use Expressed in Percentages: Storytelling



Note. LUX = Luxembourgish. GER = German. FR = French. PT = Portuguese. EN = English. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan parent questionnaire, see section 2.1.3.

Relating to the language(s) students are in contact with when watching movies, *Figure 11* illustrates that the students in the ALPHA-French group are predominantly watching movies in French (75 %) and Portuguese (39 %). The general pattern in the ALPHA-French reference group is similar although the use of French when it comes to watching movies is not as pronounced as in the ALPHA-French group (56 %). In the ALPHA-German group, a more differentiated picture arises with German (52 %) and French (48 %) being the two languages that are most prominently used when watching movies. With 32 %, Luxembourgish (i.e., the language with which 52 % of the students of this group are regularly in contact within their family) is less frequently used by the ALPHA-German group when watching movies than German, which might be due to the lower offer of movies in Luxembourgish. A similar pattern can also be observed for the ALPHA-German reference group and for their peers at the national level.

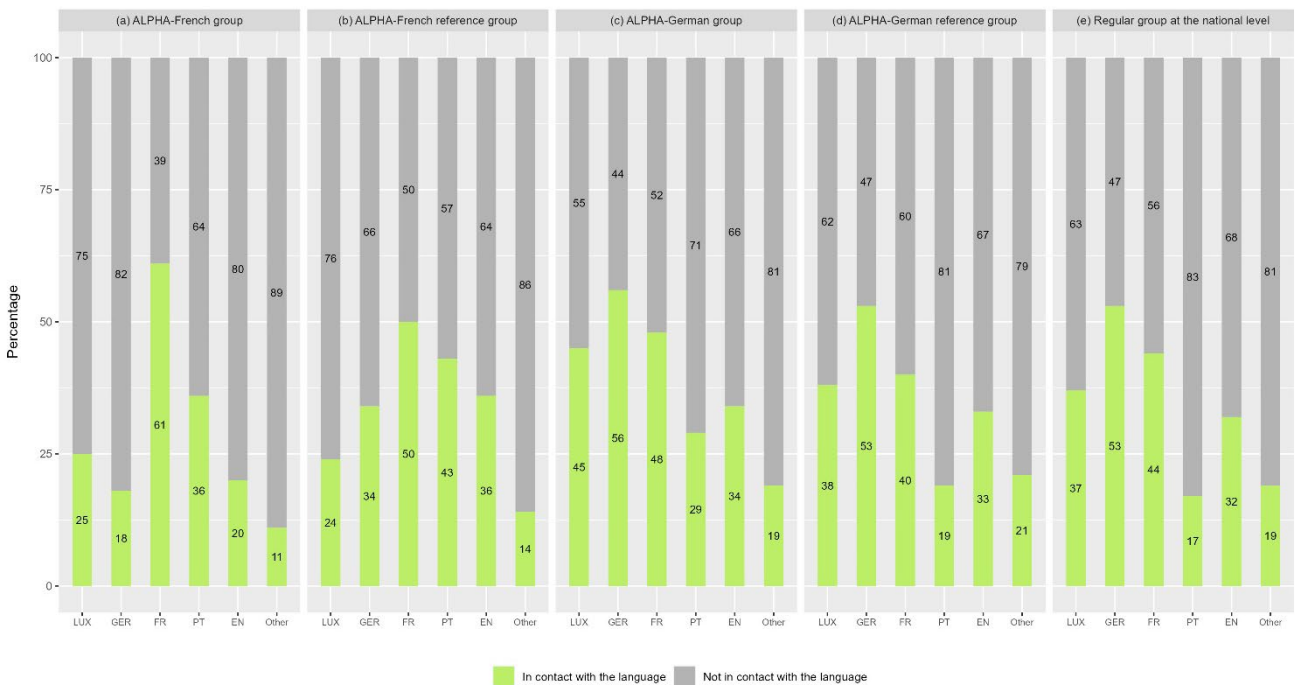
Figure 11 – Language Contact in the Context of Media Use Expressed in Percentages: Movies



Note. LUX = Luxembourgish. GER = German. FR = French. PT = Portuguese. EN = English. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan parent questionnaire, see section 2.1.3.

Figure 12 shows the language use of the students when listening to audio books and songs, a context for which the results are in line with the observations made for movie consumption (see Figure 11).

Figure 12 - Language Contact in the Context of Media Use Expressed in Percentages: Audio books and songs



Note. LUX = Luxembourgish. GER = German. FR = French. PT = Portuguese. EN = English. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan parent questionnaire, see section 2.1.3.

3.3 INTERMEDIARY SUMMARY: COMPOSITION OF THE STUDENT POPULATION

The questionnaire data on individual student background characteristics (e.g., gender, SES, language, and migration background) collected from both C2.1 students and their parents provide first insights into the composition of the pilot projects' student population. Regarding SES, the student population taking part in the pilot project has a lower SES than their peers following the regular curriculum at the national level (see *Table 1*). When it comes to their language background, students in the ALPHA-French group predominantly have a French and/or Portuguese language background, whereas their peers in the ALPHA-German group predominantly speak Luxembourgish and/or German at home.

When looking at both individual student background characteristics (e.g., higher share of students with a French or Portuguese language background; see *Table 1*) and the language(s) regularly used in different contexts (e.g., within the family or in media use, see *Figure 8* to *Figure 12*), the highest overlap between the language(s) spoken at home and the language of literacy acquisition can be identified for the ALPHA-French group. Looking at the ALPHA-German group, this overlap between the students' literacy acquisition and the language(s) spoken at home seems however less apparent. One potential explanation for this observation might lie in the fact that parents are taking the final decision in their child's orientation process (see 1.2.3 for details) and have opted for the regular literacy acquisition offered in German despite a French (11 %) or Portuguese (29 %) home language profile (see *Table 1*). Across all groups, the ALPHA-French reference group is identified as the group with the highest percentage of students learning to read and write in a language (i.e., German), which is linguistically more distant from their home language profile (i.e., 27 % of students with a French language background and 52 % of students with a Portuguese language background).

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RESULTS:

ACADEMIC ACHIEVEMENT IN DIFFERENT EDUCATIONAL KEY DOMAINS

*HOW DO THE STUDENTS OF THE PILOT PROJECT PERFORM IN
MATHEMATICS, IN LUXEMBOURGISH AND IN THEIR RESPECTIVE
LANGUAGE OF LITERACY ACQUISITION?*

4. ACADEMIC ACHIEVEMENT IN DIFFERENT EDUCATIONAL KEY DOMAINS

Considering that academic achievement is one of the most central academic outcome variables and that both national and international studies have repeatedly found significant academic achievement differences in educational key domains (e.g., mathematics, reading and listening comprehension in various languages) between student groups (e.g., Boehm et al., 2016; Hornung et al., 2021), the present chapter shows results on how the C2.1 students of the pilot project (ALPHA-French and ALPHA-German group) perform in mathematics, in Luxembourgish (communication language), and in their respective language of literacy acquisition (German or French) in comparison with their reference groups as well as with their peers at the national level.

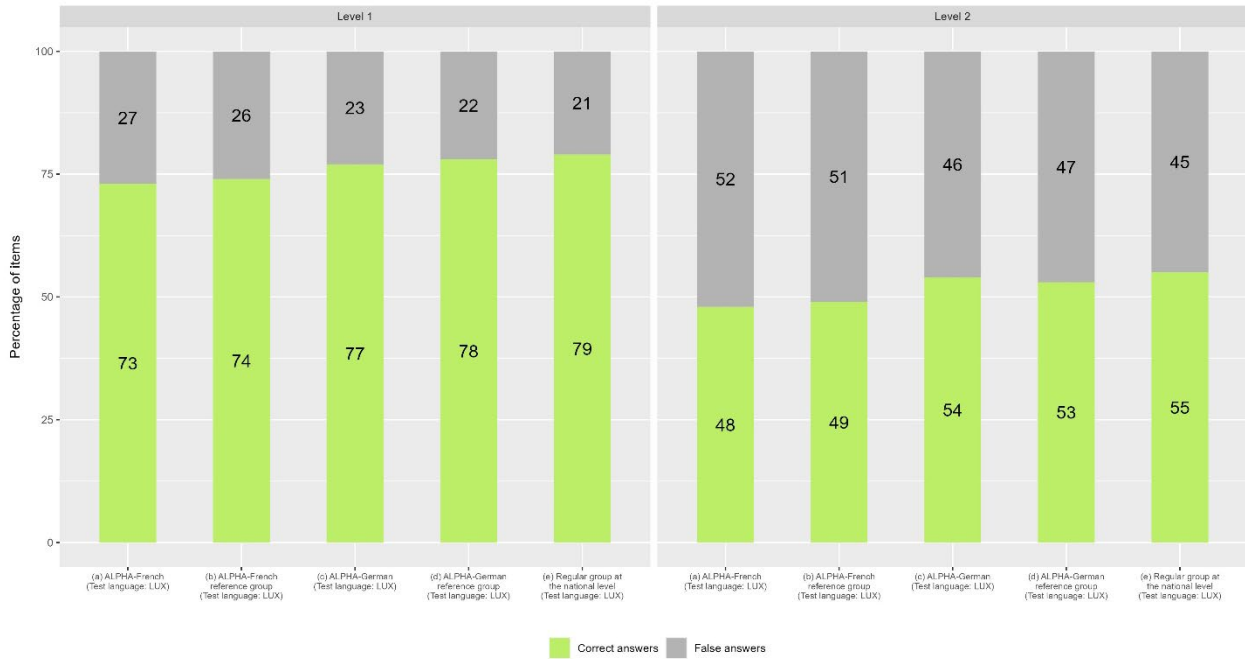
4.1 ACADEMIC ACHIEVEMENT IN MATHEMATICS

As described in more detail in section 2.1.1, the ÉpStan achievement tests are assessing whether the education standards of the previous learning cycle (MENFP, 2011) have been achieved by the students in the respective grade. Regarding C2.1, it is thus being assessed whether the education standards of *Cycle 1* have been achieved. Since the main instruction language in *Cycle 1* is Luxembourgish, the ÉpStan mathematics test has been administered in Luxembourgish to C2.1 students of all five groups. As described in more detail in section 2.3.3, the fact that all students took the exact same test allows for direct comparisons between groups.

Figure 13 depicts the academic achievement results in mathematics split by the two theoretical levels of difficulty. In line with the national education standards (*Plan d'Études*), difficulty level 1 refers to the *Niveau Socle* of *Cycle 1* and level 2 refers to the *Niveau Avancé* (for more details see 2.1.1 and 2.3.2). The green bars indicate the percentage of items that students answered correctly, whereas the grey bars indicate the percentage of items for which the students gave false or no answers.

Looking at difficulty level 1 (displayed in the left panel of *Figure 13*), students of all five groups answered more than 70 % of the mathematics items correctly, ranging from 73 % in the ALPHA-French group to 79 % at the national level. With regard to the more difficult items at level 2 (displayed in the right panel of *Figure 13*), the amount of correct answers ranged from 48 % in the ALPHA-French group to 55 % at the national level. Considering that the ÉpStan achievement test in mathematics relies on illustrations and short verbal instructions, therefore reducing the demands on language comprehension, these results seem to indicate that all students have solid basic mathematics skills in the domains of (a) *Space and shapes*, (b) *Numbers and operations*, and (c) *Measurement* (see 2.1.1.1 for details), and this irrespective of students' home language background and their language of literacy acquisition as indicated by the fact that group differences stay below 10 %.

Figure 13 – Academic Achievement in Mathematics by Theoretical Level of Difficulty



Note. LUX = Luxembourgish. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan achievement test in mathematics, see section 2.1.1.1.

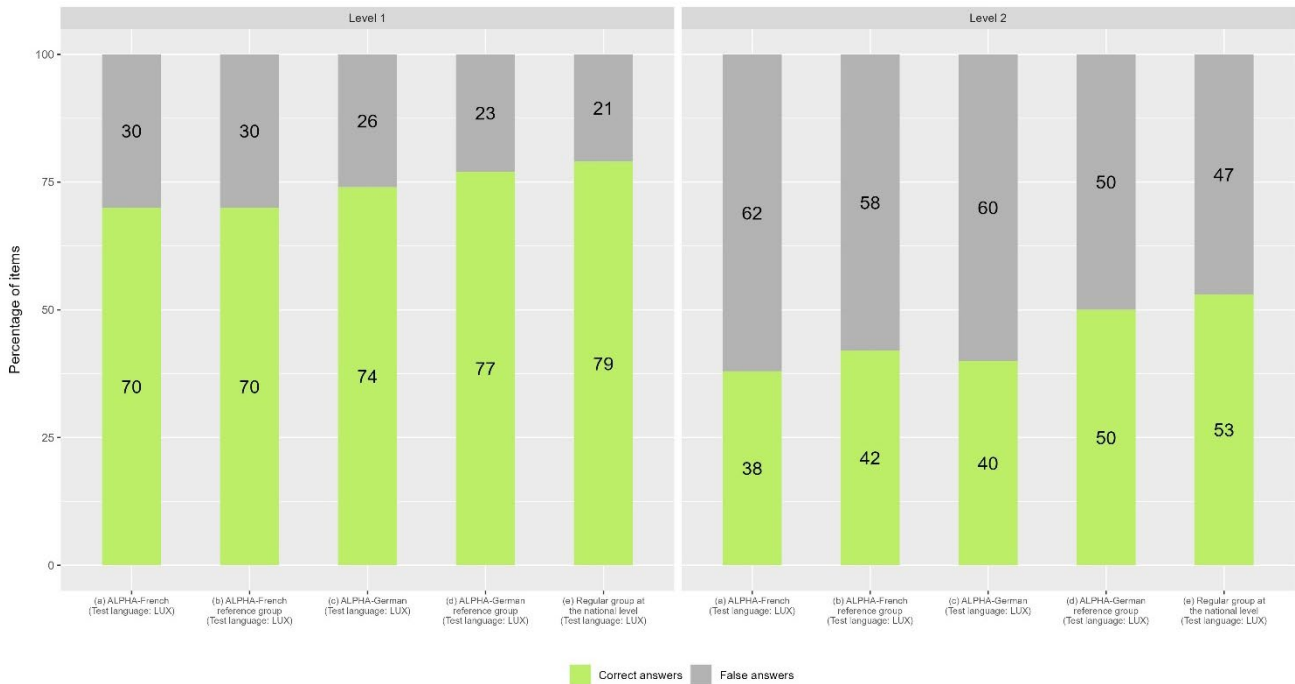
4.2 ACADEMIC ACHIEVEMENT IN LUXEMBOURGISH LISTENING COMPREHENSION

Considering that Luxembourgish is the main language of instruction in Cycle 1, the academic achievement test in Luxembourgish listening comprehension has been administered to all the students in C2.1, irrespective of whether they are attending a “Zesumme Wuessen!” or a regular classroom. As described in more detail in section 2.3.3, the fact that all students completed the exact same test allows for direct comparisons between groups.

Figure 14 illustrates the academic achievement results in Luxembourgish listening comprehension split by the two theoretical levels of difficulty with level 1 referring to the *Niveau Socle* of Cycle 1 and level 2 referring to the *Niveau Avancé* (for more details see 2.1.1.2 and 2.3.2). As indicated by the green bars, students of all five groups answered more than 70 % of level 1 items correctly, ranging from 70 % in the ALPHA-French group to 79 % at the national level. Looking at level 2, a slightly more differentiated picture arises. With a share of 38 % of correct answers in the ALPHA-French group and of 40 % in the ALPHA-German group, both groups taking part in the pilot project are performing slightly lower in Luxembourgish listening comprehension at level 2 than their peers at the national level (53 %). When looking at their respective reference groups consisting of students with more comparable individual background characteristics (see Table 1), the students from the ALPHA-French group show a comparable academic achievement in Luxembourgish listening comprehension to their reference group (difference of 4 %). When it comes to the students from the ALPHA-German group, the difference in comparison to their reference group is however larger (difference of 10 %). With around 70 % of correct items at level 1, the results seem to indicate that all students have good basic skills in

Luxembourgish listening comprehension irrespective of the students' home language background and their language of literacy acquisition as indicated by the fact that group differences stay below 10 %. By answering correctly to about 50 % of the level 2 items, the ALPHA-German reference group and the regular group at the national level seem to have slightly more advanced skills in Luxembourgish listening comprehension than the other three groups.

Figure 14 - Academic Achievement in Luxembourgish Listening Comprehension by Theoretical Level of Difficulty



Note. LUX = Luxembourgish. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan achievement test in Luxembourgish listening comprehension, see section 2.1.1.2.

4.3 ACADEMIC ACHIEVEMENT IN THE LANGUAGE(S) OF LITERACY ACQUISITION

As described in more detail in section 1.2.3, the literacy pilot project “Zesumme Wuessen!” already starts in the second year of *Cycle 1* (C1.2). The students who are going to start their literacy acquisition in French in *Cycle 2* are introduced to French in the scope of two to three weekly learning activities that are aiming at fostering early literacy competencies in French (SCRIPT & MENJE, 2023b). Similarly, these learning activities are offered in German to students who are going to pursue their literacy acquisition in German.

In order to assess achievement in the students' language(s) of literacy acquisition, the ÉpStan consist of two achievement tests tapping into listening comprehension (e.g., sentence and text comprehension) on the one hand and early literacy precursors (e.g., phonological awareness and letter knowledge) on the other hand (for more details see 2.1.1.2 and 2.1.1.3). Considering that the ÉpStan measure the learning goals from the previous learning cycle, the ALPHA-French students, who were introduced to the French language in *Cycle 1*, completed the two specific language tests in French (i.e., **French listening comprehension** and **Premiers Pas vers l'Écrit**), whereas the students from

the ALPHA-German group completed the tests in German for listening comprehension (**German listening comprehension**) and in Luxembourgish for early literacy precursors (**Éischt Schrëtt zur Schrëftsprooch**; see 2.1.1.3 for a detailed discussion on how far this constitutes a statistical and methodological limitation).

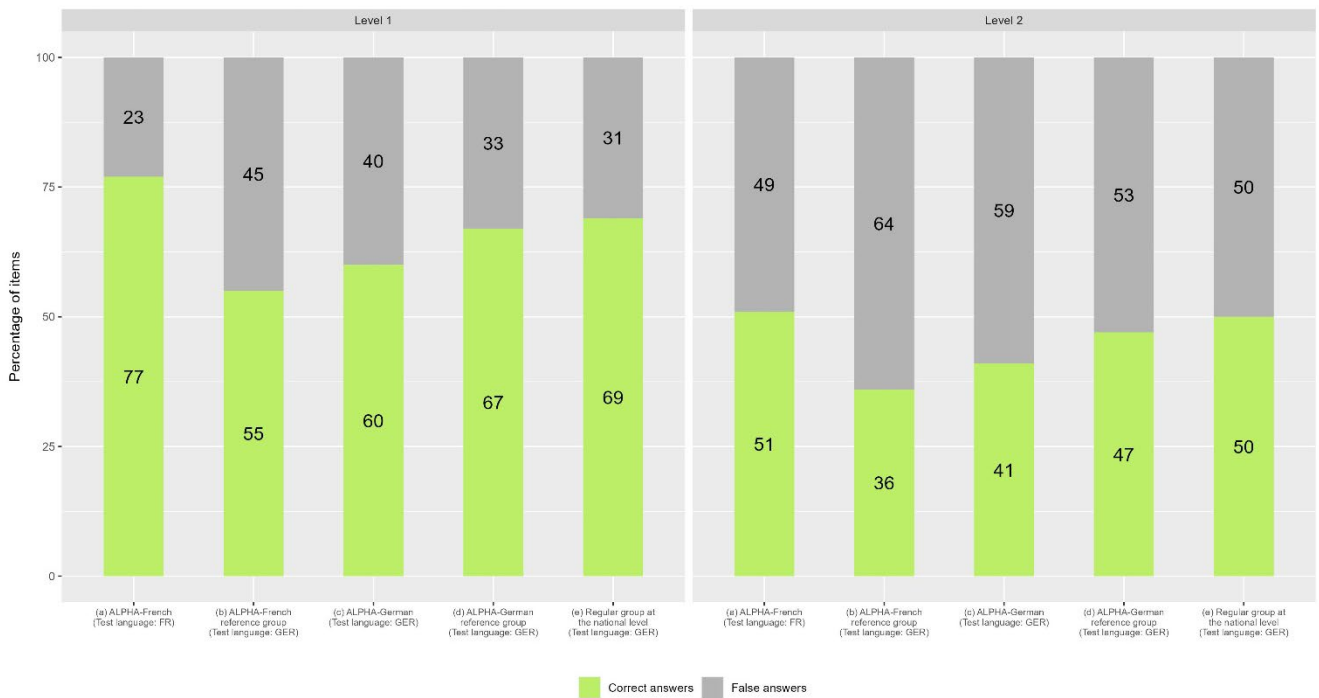
The ALPHA-French group was the only group completing the two language tests in French, whereas all other groups completed the tests in German and Luxembourgish. Although all ÉpStan language tests were developed respecting the same procedures (e.g., in teams with interdisciplinary experts) and by relying on the same reference documents (i.e., *Plan d'Études*; MENFP, 2011), thereby guaranteeing a **conceptual equating**, comparisons of groups therefore have to be interpreted with caution.

4.3.1 LISTENING COMPREHENSION IN THE LANGUAGE OF LITERACY ACQUISITION

In the following, the results for listening comprehension in the students' respective language of literacy acquisition are being presented. As indicated in *Figure 15*, the ALPHA-French group correctly completed 77 % of level 1 items and 51 % of level 2 items in **French listening comprehension**. The ALPHA-French reference group, to which the **German listening comprehension** test was administered, completed 55 % of level 1 items and 36 % of level 2 items correctly.

These results indicate a considerably higher success rate (ranging between 15 % at level 2 and 22 % at level 1) for the ALPHA-French group, who completed the listening comprehension test in a language (i.e., French) which is closer to their home language background (i.e., French and/or Portuguese, see *Table 1* or *Figure 8*). By completing 60 % of level 1 items and 41 % of level 2 items correctly, the ALPHA-German students performed slightly lower than the students from their reference group (difference ranging between 6 % at level 2 and 7 % at level 1) in **German listening comprehension**, whose amount of correct answers is similar to the national level.

Figure 15 - Academic Achievement in Listening Comprehension by Theoretical Level of Difficulty



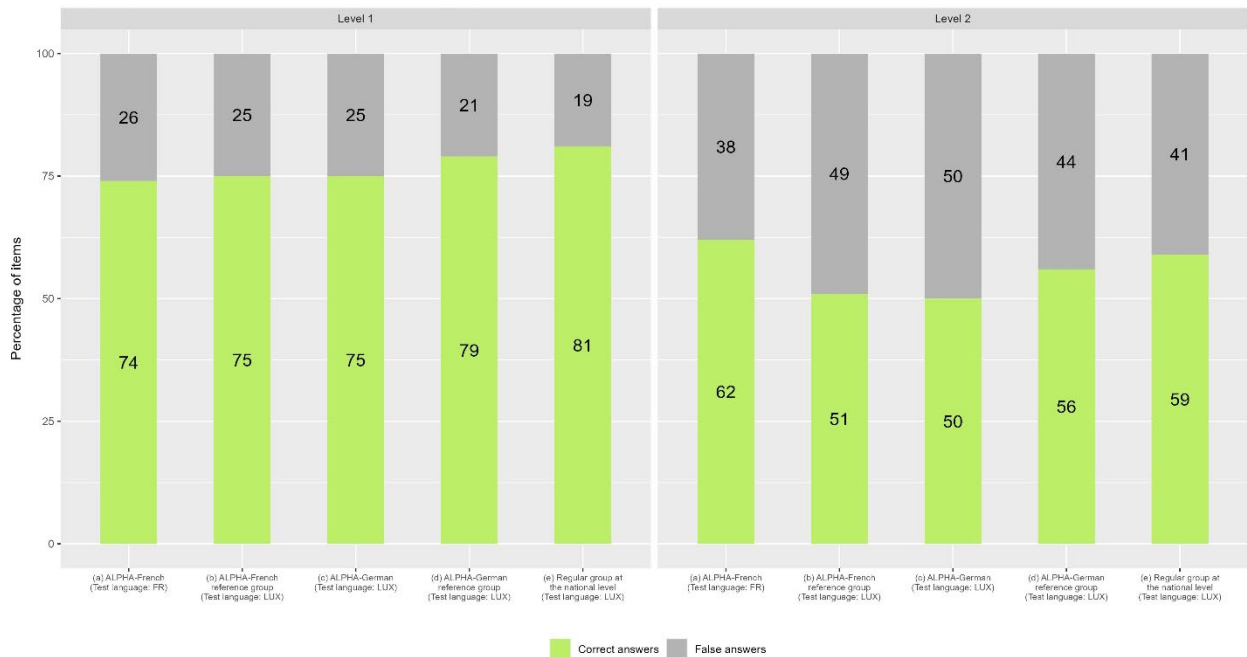
Note. FR = French. GER = German. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan achievement test in the two languages of literacy acquisition, see section 2.1.1.2.

4.3.1 EARLY LITERACY SKILLS IN THE LANGUAGE OF LITERACY ACQUISITION

Figure 16 shows the results for the C2.1 students' early literacy skills. As indicated by the green bars, the students of all five groups answered more than 70 % of level 1 items correctly, ranging from 74 % in the ALPHA-French group to 81 % at the national level. Looking at the more difficult items at level 2, a more differentiated picture arises. Whereas the ALPHA-French group correctly answered 62 % of the level 2 items of the French early literacy test (**Premiers Pas Vers l'Écrit**), its reference group, which completed the Luxembourgish early literacy test (**Éischt Schrëtt zur Schrëftsprooch**) answered 51 % of level 2 items correctly. These results indicate a slightly higher success rate of 11 % at level 2 for students from the ALPHA-French group, who completed the test in a language (i.e., French) that is closer to their home language background (i.e., French and/or Portuguese, see Table 1 or Figure 8). By answering correctly to 50 % of level 2 items, the ALPHA-German group stays 6 % below the performance of their reference group and 9 % below the national level. The difference in academic achievement in early literacy is less pronounced between the students of the ALPHA-French group and their reference group than in listening comprehension (see Figure 15). One potential explanation for this observation might be that the early literacy test was administered in French to the ALPHA-French group, whereas it was administered in Luxembourgish to all other groups. Considering that Luxembourgish is the main communication language in Cycle 1, it can be assumed that the students from these four groups are more familiar with Luxembourgish than with German, which translates into higher achievement at both

levels in the Luxembourgish early literacy test compared to their results in German listening comprehension.

Figure 16 - Academic Achievement in Early Literacy by Theoretical Level of Difficulty



Note. FR = French. LUX = Luxembourgish. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan achievement test in the two languages of literacy acquisition, see section 2.1.1.3.

4.4 INTERMEDIARY SUMMARY: ACADEMIC ACHIEVEMENT

Results of the ÉpStan achievement tests in mathematics and Luxembourgish listening comprehension, which are directly comparable, were able to demonstrate that a vast majority of students have achieved the *Niveau Socle* of Cycle 1 and are furthermore able to solve a considerable amount of the more difficult items at the *Niveau Avancé*. With group differences that do not go beyond 7 percentage points at level 2 in mathematics, it can be concluded that all students start primary education (C2.1) with solid basic skills in mathematics; a finding that can be observed irrespective of the students' home language background and their language of literacy acquisition. When it comes to Luxembourgish listening comprehension, group differences that stay below 10 % at level 1 indicate that all C2.1 students have good basic skills in Luxembourgish listening comprehension with students from the ALPHA-German reference group and the regular group at the national level displaying slightly more advanced skills in Luxembourgish listening comprehension at level 2 than the other three groups.

The fact that the two ÉpStan achievement tests that are directly comparable show that all the C2.1 students have good basic skills in both mathematics and Luxembourgish listening comprehension irrespective of their home language background and their language of literacy acquisition, allows to rule out the existence of considerable group differences in basic academic skills (e.g., high amount of statistical outliers with particularly high or low ÉpStan scores in one of the pilot project groups). This has

to be considered as an important factor when comparing academic achievement of the ÉpStan tests in the students' respective language of literacy acquisition.

Despite the small sample sizes of the ALPHA-French ($N = 48$) and the ALPHA-German group ($N = 65$) and the fact that the students from the ALPHA-French group were the only ones to complete the tests in French, the results of the ÉpStan achievement tests in the students' language of literacy acquisition can be considered as a first tentative indication that the students from the ALPHA-French group, who completed the test in a language closer to their home language background, perform better in listening comprehension (ranging between 15 % at level 2 and 22 % at level 1, see *Figure 15*) and in early literacy (11 % at level 2, see *Figure 16*) when compared to their peers with comparable individual background characteristics (ALPHA-French reference group, see *Table 1*), who completed the academic achievement tests in German and Luxembourgish, two languages that are linguistically (e.g., vocabulary, syntax, phonology) further away from their home language background.

...

RESULTS:

ACADEMIC MOTIVATION AND STUDENT WELLBEING

How does the pilot project affect the C2.1 students' academic motivation and wellbeing?

5. ACADEMIC MOTIVATION AND STUDENT WELLBEING

Schools are not only responsible to teach their students' academic skills but should furthermore be considered as learning environments that foster students' motivation (e.g., academic self-concept and interest) and enable them to develop a positive attitude towards learning in a supportive climate (e.g., class and school climate, teacher-student relationship). In light of a strong consensus in research that academic motivation and academic achievement are related to each other (Niepel et al., 2014; Schiefele et al., 2016; Wolff et al., 2021), the present chapter analyses how the pilot project affects the students' academic motivation and wellbeing.

5.1 GENERAL AND DOMAIN-SPECIFIC ACADEMIC MOTIVATION

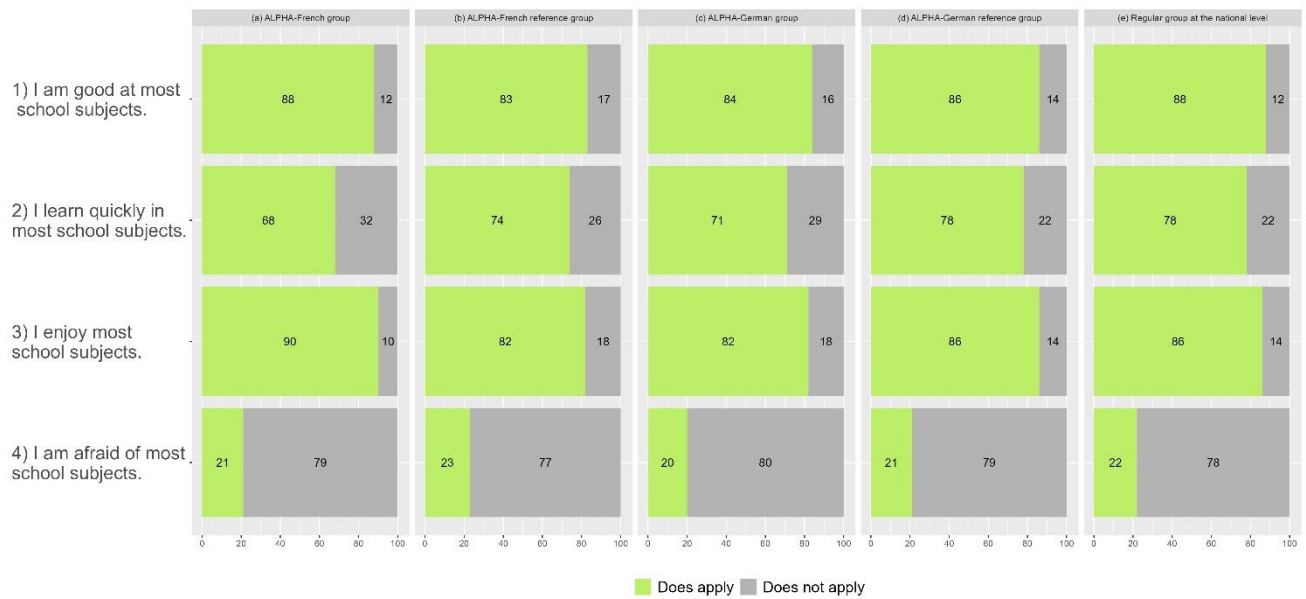
As described in more detail in section 2.1.2, the ÉpStan student questionnaire is assessing motivational aspects (i.e., academic self-concept, academic interest, and academic anxiety) both at the general (i.e., across school subjects) and at the domain-specific level (i.e., mathematics, language of literacy acquisition). Students are thereby invited to express their level of (dis-)agreement on a two-point Likert scale using age-appropriate shaking heads as symbols for either agreement (yes) or disagreement (no) with various statements (e.g., "*I am interested in most school subjects*"). The student questionnaire is presented to the students in their respective language of literacy acquisition, and teachers refer to standardised translations of all items in Luxembourgish to support the students during the completion of the questionnaire.

5.1.1 GENERAL ACADEMIC MOTIVATION

Figure 17 shows the results for the C2.1 students' general academic motivation with the first two items assessing general academic self-concept, item 3 assessing general academic interest and item 4 assessing general academic anxiety. As expressed by the green bars, the vast majority of C2.1 students have a high general academic self-concept ranging from 83 % (ALPHA-French reference group) to 88 % (ALPHA-French group and at national level) for item 1 ("*I am good at most school subjects*"). For item 2 assessing general academic self-concept ("*I learn quickly in most school subjects*"), the agreement of students is slightly lower (ranging from 68 % in the ALPHA-French group to 78 % in the ALPHA-German reference group and for students at national level) but indicates nevertheless that the vast majority of C2.1 students have a positive general academic self-concept. Regarding item 3 ("*I enjoy most school subjects*"), results furthermore indicate that C2.1 students have a high general academic interest (ranging from 82 % in the ALPHA-French reference group to 90 % in the ALPHA-French group). As indicated by the grey bars for item 4 ("*I am afraid of most school subjects*"), the vast majority of C2.1 students indicates that they do not perceive feelings of general academic anxiety. General academic motivation is thus very high across all items; an observation that can be made irrespective of the students' home language background and their language of

literacy acquisition considering that group differences are ranging between 3 % for item 4 and a maximum of 10 % for item 2.

Figure 17 – General Academic Motivation Expressed in Percentages

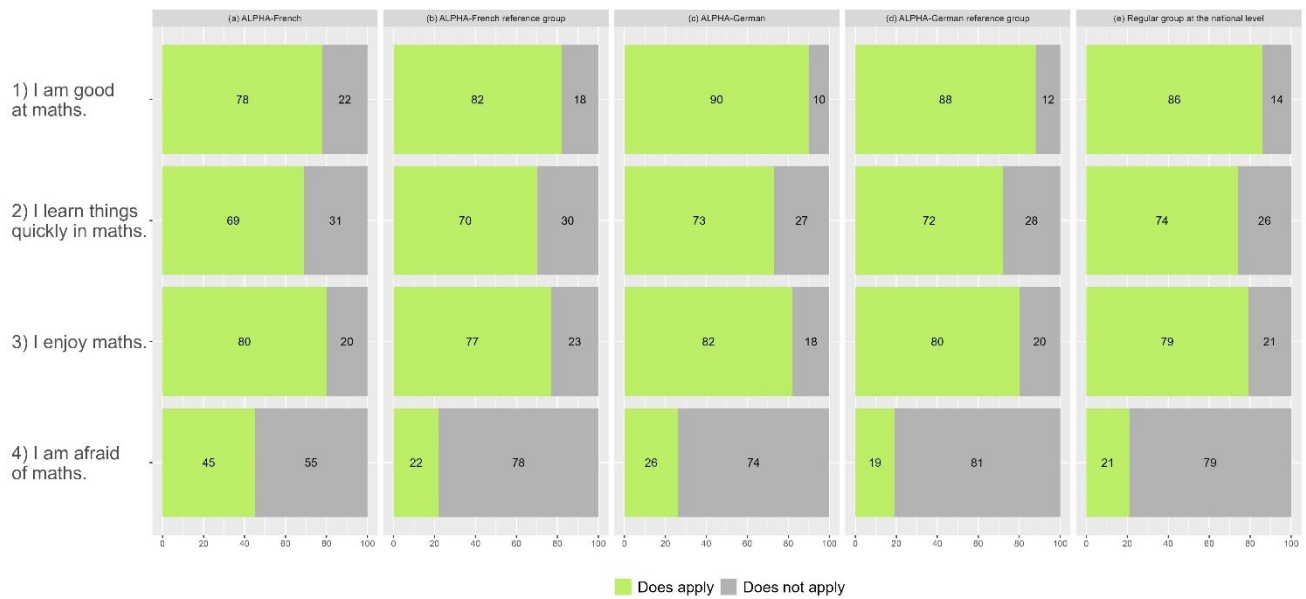


Note. For more information on the five student groups, see section 2.3.1 and for more information on the constructs assessed in the ÉpStan student questionnaire see section 2.1.2.

5.1.2 DOMAIN-SPECIFIC ACADEMIC MOTIVATION

Figure 18 illustrates the results for C2.1 students' domain-specific academic motivation in mathematics with the first two items assessing academic self-concept, item 3 assessing academic interest and item 4 assessing academic anxiety. As expressed by the green bars, the vast majority of C2.1 students have a high academic self-concept in mathematics ranging from 78 % in the ALPHA-French group to 90 % in the ALPHA-German group for item 1 ("I am good at maths"). For item 2 ("I learn things quickly in maths"), students of all five groups show a slightly lower level of agreement (ranging from 69 % in the ALPHA-French group to 74 % at national level), which shows that the majority of C2.1 students report having a positive domain-specific academic self-concept in mathematics. Regarding domain-specific academic interest, the results of item 3 indicate that most C2.1 students enjoy mathematics (with agreement rates ranging from 77 % in the ALPHA-French reference group to 82 % in the ALPHA-German group). As indicated by the grey bars for item 4 ("I am afraid of maths"), the strong majority of C2.1 students indicates that they do not perceive feelings of mathematics anxiety, except for students from the ALPHA-French group, out of which 45 % indicated to perceive mathematics anxiety. Domain-specific academic motivation in mathematics is generally perceived as high in C2.1; an observation that can be made irrespective of the students' home language background and their language of literacy acquisition. The only exception are students in the ALPHA-French group that perceive higher mathematics anxiety than students from the other four groups.

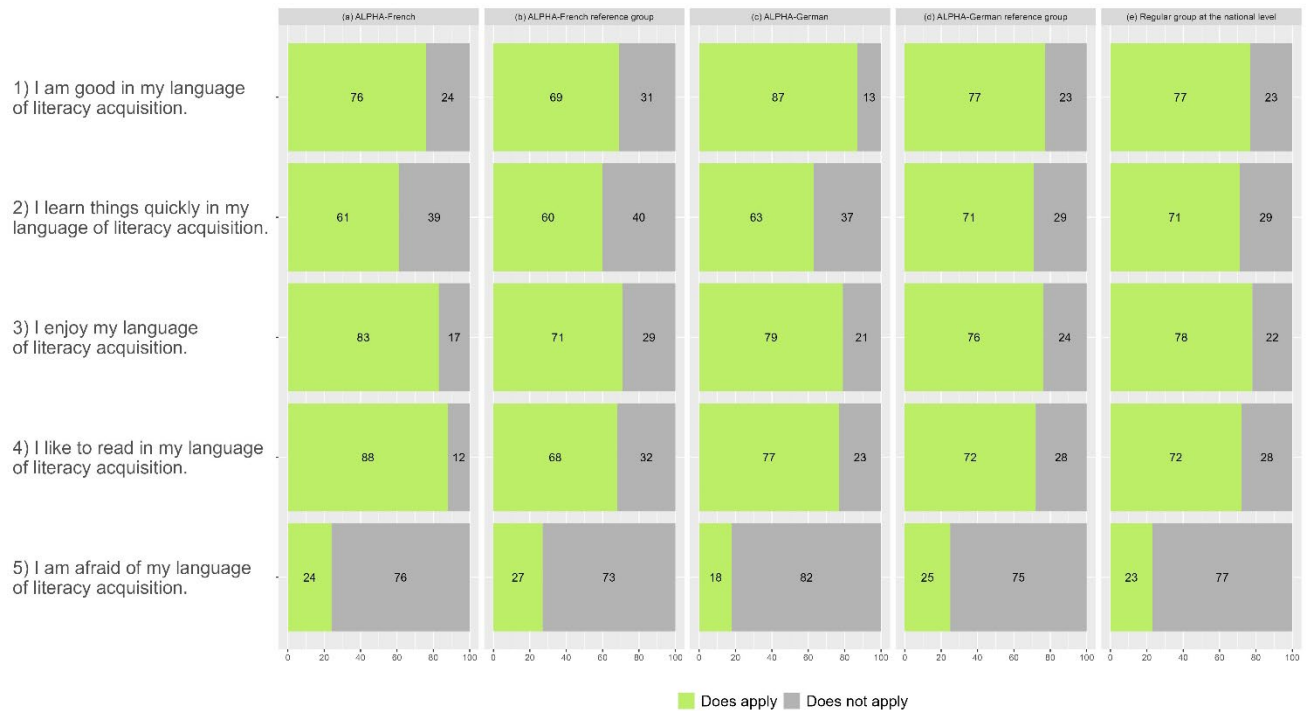
Figure 18 – Domain-specific Academic Motivation in Mathematics Expressed in Percentages



Note. For more information on the five student groups, see section 2.3.1 and for more information on the constructs assessed in the ÉpStan student questionnaire see section 2.1.2.

Regarding domain-specific academic motivation in the students' language of literacy acquisition, the items were presented to the students in the ALPHA-French group referring to French (e.g., “I am good in French”), whereas all the other groups responded to the items referring to German (e.g., “I am good in German”). Figure 19 shows the results for domain-specific academic motivation in the language of literacy acquisition with the first two items assessing academic self-concept, items 3 and 4 assessing academic interest and item 5 assessing academic anxiety. Across all five items, students in the ALPHA-French group are showing slightly higher percentages of agreement than the students from the ALPHA-French reference group with the difference being most pronounced for the items assessing academic interest and thus related to enjoyment. Looking, for example, at the item “I like to read in my language of literacy acquisition” (Item 4), 88 % of students from the ALPHA-French group, presented with the French-specific items, indicated agreement, whereas this only applied to 68 % of the students in the ALPHA-French reference group, presented with the German-specific items. Looking at the ALPHA-German group, 87 % of the students indicated the perception to be good in their language of literacy acquisition (i.e., German, item 1) compared to 77 % in their reference group. The differences between the ALPHA-German students and the ALPHA-German reference group do not go beyond 8 % for all other items. As for mathematics, domain-specific academic motivation in the students' language of literacy acquisition is generally perceived as high by all students in C2.1; an observation that seems independent of the students' home language background and their language of literacy acquisition. The only exception are ALPHA-French students that show a considerably higher level of agreement when it comes to domain-specific academic interest in French and reading in French (difference ranging from 12 % for item 3 to 20 % for item 4) compared to their reference group.

Figure 19 - Domain-specific Academic Motivation in the Language of Literacy Acquisition Expressed in Percentages



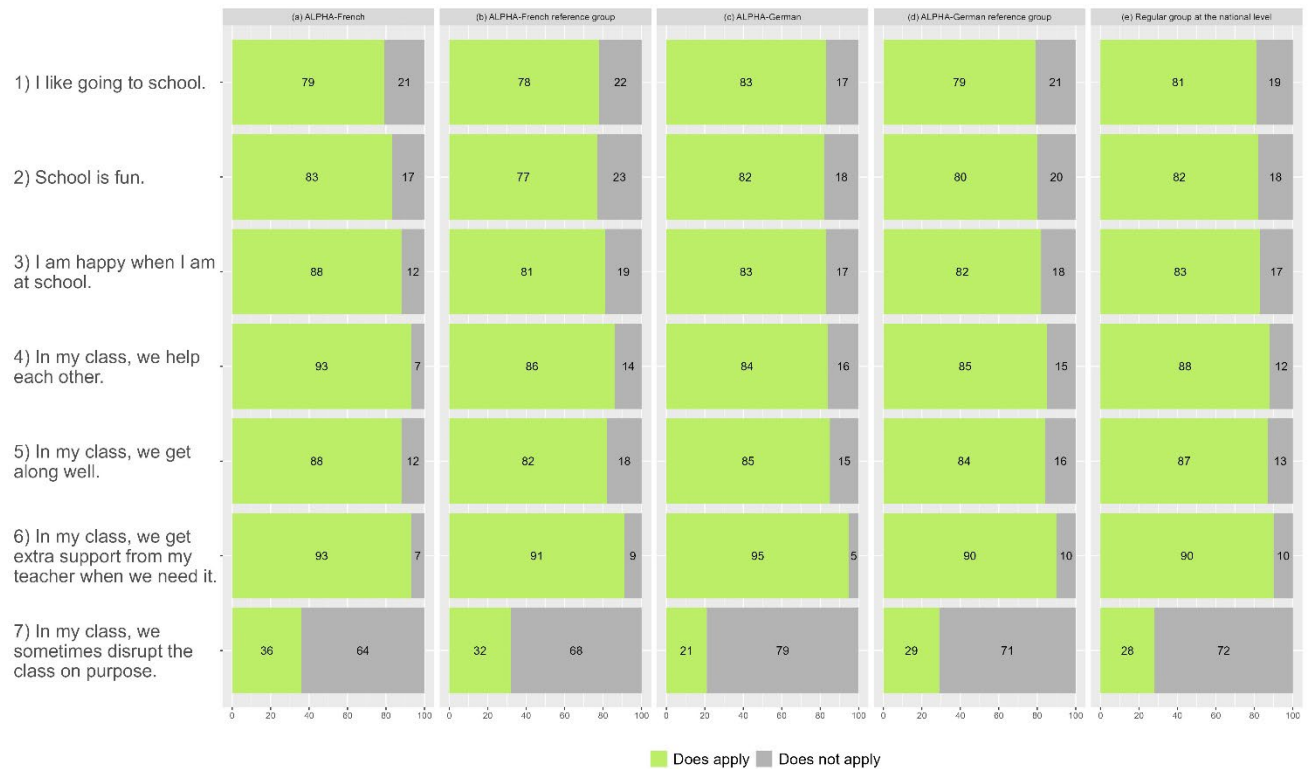
Note. For visualisation purposes, the questionnaire items were rephrased for the present figure in such a way that all the items apply to the five student groups, whereas the phrasing in the original questionnaire presented to the students was in line with their respective language of literacy acquisition (i.e., “I am good in French” for the ALPHA-French group versus “I am good in German” for the other four groups). For more information on the five student groups, see section 2.3.1 and for more information on the constructs assessed in the ÉpStan student questionnaire see section 2.1.2.

5.2 ACADEMIC WELLBEING

Figure 20 illustrates the results for C2.1 students' academic wellbeing with the first three items assessing general school satisfaction, items 4 and 5 assessing class climate, item 6 assessing the teacher-student relationship and item 7 assessing the students' tendency for disruptions. As indicated by the green bars, the vast majority of C2.1 students perceive a high school satisfaction ranging from 77 % (ALPHA-French reference group for the item “School is fun”) to 88 % (ALPHA-French group for the item “I am happy when I am at school”). With high agreement rates ranging from 81 % (ALPHA-French reference group) to 93 % (ALPHA-French group) for the items 4 (“In my class, we help each other”) and 5 (“In my class, we get along well”), the results furthermore indicated that students perceive their class climate to be very positive, as they experience a feeling of cohesion and support from their peers. The high percentage of agreement expressed for the two items assessing class climate by the ALPHA-French and the ALPHA-German group is thereby particularly noteworthy, indicating that they perceive themselves as a cohesive class, despite the fact that they are taught in mixed classes (i.e., consisting of students from the ALPHA-French and the ALPHA-German group), in which different student constellations are coming together for different subjects (see 1.2.2 for details). The perception of the students from the two ALPHA groups thereby seems to be in line with the perception of the C2.1 and

C2.2 teachers of the four schools participating in the pilot project, out of which 89 % (rather) do not agree that the pilot project leads to a segregation between the two language groups. Looking at item 6 ("In my class, we get extra support from my teacher when we need it"), the very high agreement rates ranging from 90 % (ALPHA-German reference group and students at national level) to 95 % (ALPHA-German group) underlines that the vast majority of C2.1 students experience a highly positive teacher-student relationship. As indicated by the grey bars item 7 ("In my class, we sometimes disrupt the class on purpose"), the majority of C2.1 students indicate a rather low tendency for disruption. The results displayed in Figure 20 indicate that academic wellbeing is generally very high across all seven items; an observation that can be made irrespective of the students' home language background and their language of literacy acquisition considering that group differences do not go beyond 10 %, with the only exception being a slightly higher tendency for disruption in the ALPHA-French group compared with the ALPHA-German group (see item 7).

Figure 20 - Academic Wellbeing Expressed in Percentages



Note. For more information on the five student groups, see section 2.3.1 and for more information on the constructs assessed in the ÉpStan student questionnaire see section 2.1.2.

5.3 INTERMEDIARY SUMMARY: ACADEMIC MOTIVATION AND WELLBEING

The student questionnaire data on academic motivation and wellbeing collected from C2.1 students indicated that a high majority of students expressed a strong general academic motivation (see *Figure 17*) and a high academic wellbeing (see *Figure 20*) at the beginning of primary education. With these findings showing a comparable pattern across all five groups, it seems that students' home language background and their language of literacy acquisition do not impact the self-reported perceptions of general academic motivation and wellbeing.

Looking at domain-specific academic motivation in the students' language of literacy acquisition, a slightly more differentiated picture arises (see *Figure 19*). The students in the ALPHA-French group have a higher agreement of almost 20% on the two items assessing academic interest related to enjoyment of the language (see items 3 and 4) than their reference group. These results provide a first preliminary indication that students in the ALPHA-French group are more motivated to learn and read in a language closer to their home language background (i.e. French and/or Portuguese, see *Table 1*), compared to students with similar background characteristics (ALPHA-French reference group) who learn to read and write in a language (i.e. German) that is linguistically further away from their home language background. This observation seems particularly noteworthy in the light of research findings that have shown a positive relation between reading and later reading development (Stanovich, 1986).

Regarding domain-specific academic motivation in mathematics, the ALPHA-French students expressed a considerably higher level of mathematics anxiety than students from the other four groups (see item 4 in *Figure 18*); a perception which does however not seem to be directly reflected in their academic achievement in the domain of mathematics (see *Figure 13*). Nevertheless, this finding is considerable and should be further investigated in future studies.

Considering the fact that the ALPHA-French and ALPHA-German groups are taught in mixed classes (i.e., consisting of students from the ALPHA-French and the ALPHA-German group), in which different student constellations are coming together for different subjects (see 1.2.2 for details), results on wellbeing indicate that the students participating in the pilot project perceived themselves as belonging to a cohesive class, in which they support each other. This perception is in line with the perception of C2.1 and C2.2 teachers of the four schools participating in the pilot project, stating that the pilot project (rather) does not lead to a segregation between the two language groups.

...

RESULTS:

PERCEPTION OF PARENTAL SUPPORT

How does the pilot project affect the parents' perception of how they can support their child academically?

6. PERCEPTION OF PARENTAL SUPPORT

In addition to the students' academic achievement and motivation, the parents' possibilities to support their child when it comes to learning (e.g., doing homework, preparing for tests) have been identified to be positively related to academic achievement (Bakker et al., 2007; Boonk et al., 2018). Therefore, the present chapter aims at understanding how the possibility to offer parental support, which depends (at least partially) on the parents' own language abilities in their child's instruction language(s), is perceived by parents of C2.1 students.

6.1 PARENTAL PERCEPTIONS ON MULTILINGUALISM AND ACADEMIC SUPPORT

As described in more detail in section 2.1.3, the recent ÉpStan parent questionnaire extension focusing on parental support invites parents to express their level of (dis-)agreement to statements presented on a four-point Likert scale ranging from "does not apply" to "does apply". The parent questionnaire is made available in four different languages (i.e., German, French, English and Portuguese). Figure 21 illustrates the perceptions of parents having a child attending C2.1 on multilingualism in Luxembourg's education system (items 1 and 2), on their own and the teachers' role to support their child in learning (items 3 and 4), on their possibilities to exchange with their child's teacher (items 5 and 6), as well as on their perceived ability to support their child academically in relation to their own language skills (items 7 to 9).

As indicated by the dark and light green bars, the vast majority of parents from all five groups (rather) agree that the multilingualism of the schools in Luxembourg offers their child good future opportunities, ranging from 95 % in the ALPHA-French group to 98 % in the ALPHA-German reference group (see item 1). Despite this positive perception of multilingualism as such, approximately one third of all the parents did (rather) agree that the multilingualism in Luxembourg's schools poses a difficulty to their child with this perception being most pronounced in the ALPHA-French group (40 %, see item 2).

When it comes to supporting their child in school learning, parents of all five groups strongly agree that both teachers (ranging from 90 % in the ALPHA-German group to 96 % in the ALPHA-French reference group, see item 3) and themselves as parents or legal guardians (ranging from 95 % in the ALPHA-French group to 99 % in the ALPHA-German group, see item 4) are responsible to support the children in their school learning.

Considering the exchange with their child's teacher (e.g., during the *Bilan* talks or at parents' evenings), the vast majority of parents across all groups (ranging from 92 % in the ALPHA-German group to 96 % in the ALPHA-German reference group and at the national level) perceive that their own language skills allow them to communicate well with their child's teacher (see item 5). In addition, most parents



Figure 21 – Parental Perceptions on Multilingualism and Academic Support Expressed in Percentages



Note. If the sum of a group's percentages for an item does not add up to 100 %, this is due to rounding up or down. For more information on the five student groups, see section 2.3.1 and for more information on the constructs assessed in the ÉpStan student questionnaire see section 2.1.2.

can rely on help from the school and/or school external help when having difficulties in exchanging with their child's teacher (ranging from 80 % in the ALPHA-French group to 88 % in the ALPHA-German group, see Item 6).

The last three items are specifically interesting to understand how the parents' own language skills in their child's language of literacy acquisition allow them to support their child academically (e.g., in learning how to read and write, in the subject of mathematics and during their homework). In contrast to the other items, considerable group differences can be identified for these items especially when looking at the ALPHA-French group and its direct reference group.

Whereas 32 % of the parents of the ALPHA-French reference group have the perception that they are (rather) not able to support their child when learning to read and write due to their own skills in their child's language of literacy acquisition, this only applies to 11 % of parents in the ALPHA-French group (see item 7). A similar pattern emerges regarding support during homework (see item 9) with 27 % of the parents of the ALPHA-French reference group stating that they feel (rather) not able to support their child during homework compared to 9 % of parents in the ALPHA-French group. When it comes to support in the subject of mathematics (see item 8), the difference between the ALPHA-French group (8 %) and its reference group (18 %) is slightly less pronounced. For all three parental support items, the differences between the three other groups are smaller. Item 7 focusing on support in literacy acquisition is showing a slightly higher percentage of parents, which (rather) do not perceive themselves as being able to support their child academically due to their own language skills in their child's language of literacy acquisition.

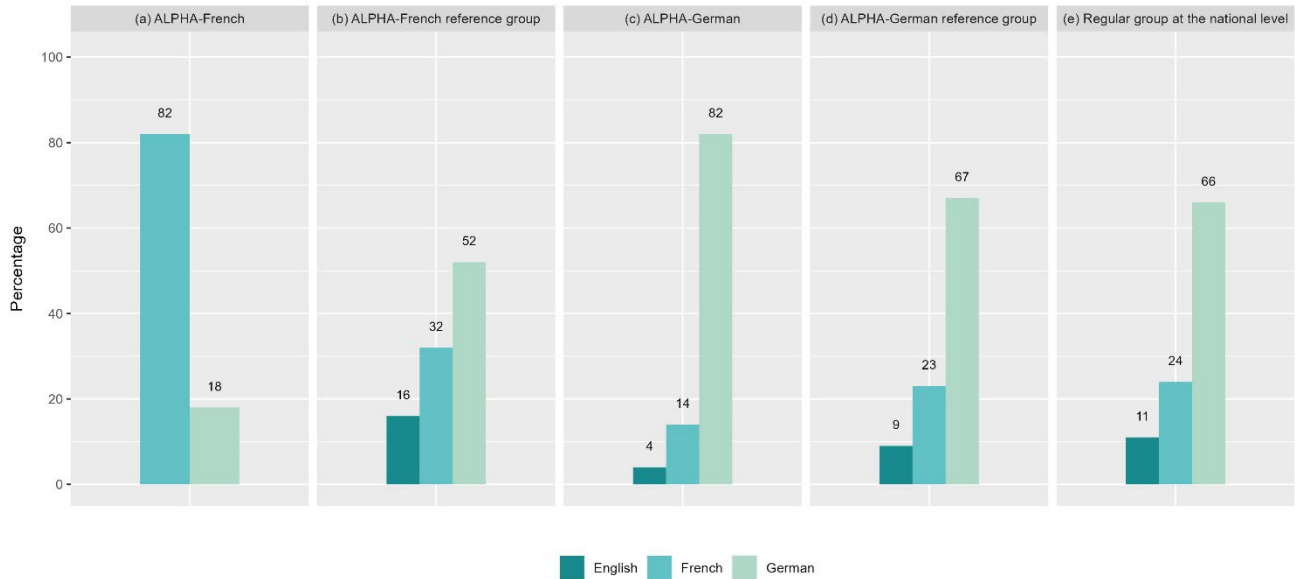
6.2 PREFERRED LANGUAGE OF LITERACY ACQUISITION

In the parent questionnaire, parents were furthermore asked which language of literacy acquisition they would prefer for their child. German, French and English were thereby given as possible answer options, considering that those are the three languages in which literacy acquisition is currently possible in the school system (i.e., for a small number of students in the scope of the pilot project and for the general population in the six International Public Schools of the country).

Figure 22 depicts the findings for the parents' preferred language of literacy acquisition for their child. The strongest overlap between the child's actual language of literacy acquisition and the parents' preferred language of literacy acquisition can be observed in both the ALPHA-French and the ALPHA-German group (82 %). In the other three groups, the majority of parents indicated German to be their preferred language of literacy acquisition (ranging from 52 % in the ALPHA-French reference group to 67 % in the ALPHA-German reference group). It is however noteworthy that approximately one third of the parents from the ALPHA-French reference group would have preferred French (32 %) as language of literacy acquisition, followed by English (16 %). Although slightly less pronounced, the

same pattern can also be observed for the ALPHA-German reference group and at the national level where one third of the parents would have opted for either French or English if given the choice. Similar results on the parents' preferred language of literacy acquisition also exist for C3.1 and C4.1, but focus on language background groups (i.e., Luxembourgish/German, French and Portuguese) instead of the five groups used for the evaluation of the pilot project (see Annex).

Figure 22 – Preferred Language of Literacy Acquisition Expressed in Percentages



Note. For more information on the five student groups, see section 2.3.1 and for more information on the ÉpStan parent questionnaire see section 2.1.3.

6.3 INTERMEDIARY SUMMARY: PERCEPTIONS OF PARENTAL SUPPORT

The findings from the parental support questionnaire seem to indicate that the parents of the ALPHA-French group and the ALPHA-German group are satisfied with the choice of their child's language of literacy acquisition (see Figure 22). Looking at items 7 to 9 of Figure 21, it becomes apparent that parents from the ALPHA-French group perceive themselves as more able to support their child academically (e.g., in literacy acquisition, in mathematics and when doing homework) due to their own French language skills. This observation seems particularly noteworthy when compared to the parents of students with similar individual background characteristics in the ALPHA-French reference group that perceive themselves less able to support their child academically due to their own language skills in German. In light of research findings that the parents' possibilities to support their child when it comes to learning (e.g., doing homework, preparing for tests) positively relate to academic achievement (Bakker et al., 2007; Boonk et al., 2018), it can potentially be expected that the students from the ALPHA-French group will specifically benefit from their parents' perceived ability to support them more strongly when learning during their educational career (e.g., higher achievement scores, lower grade retention rates).

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CONCLUSION AND OUTLOOK

WHAT ARE THE MAIN FINDINGS OF THE PRESENT REPORT AND WHAT IMPLICATIONS DO THEY HAVE FOR FUTURE RESEARCH?

7. CONCLUSION AND OUTLOOK

Luxembourg's student population is characterised by a high socioeconomic, cultural and linguistic diversity with a high percentage of both primary (68 %) and secondary school students (65 %) speaking a different language than Luxembourgish at home (SCRIPT & MENJE, 2023a). National and international studies have repeatedly shown that students with a low socioeconomic status (SES) and/or students speaking a language other than Luxembourgish and/or German at home are more likely to struggle academically in the Luxembourgish education system (Boehm et al., 2016; Hadjar et al., 2018; Hornung et al., 2021).

To deal more adequately with this high language diversity of the student population, the Luxembourgish government has recently introduced the literacy pilot project "Zesumme Wuessen!" in four primary schools, which offers C2.1 students the choice of a literacy acquisition within mixed classes in either French or German (MENJE, 2022).

By a stepwise extension of the Luxembourg School Monitoring Programme "Épreuves Standardisées" (ÉpStan), the Luxembourg Centre for Educational Testing (LUCET) has assessed all the C2.1 students participating in the pilot project with regard to academic achievement in selected educational key domains (i.e., mathematics, Luxembourgish listening comprehension, as well as listening comprehension and early literacy in the students' respective language of literacy acquisition), and has furthermore collected data on general and domain-specific academic motivation and academic wellbeing (via student questionnaires) and on parental support (via parent questionnaires). The ÉpStan thereby offer an encompassing data base that allows a first comprehensive evaluation of the pilot project. The main results are summarised and discussed in the following before pointing out important methodological limitations and providing an outlook for future research.

7.1 SUMMARY AND DISCUSSION OF THE REPORT'S MAIN FINDINGS

Based on questionnaire data collected from both C2.1 students and their parents, the present report has in a first step analysed the **composition of the student population** taking part in the pilot project. Both the ALPHA-French and the ALPHA-German students are characterised by a lower SES than their peers following the regular curriculum at the national level. Regarding language background, students in the ALPHA-French group predominantly have a French and/or Portuguese language background, whereas students in the ALPHA-German group predominantly speak Luxembourgish and/or German at home (see *Table 1* and *Figure 8*). In light of research findings showing that students are particularly at risk of being academically disadvantaged when the language spoken at home differs from the instruction language(s) in school (e.g., Röthlisberger et al., 2021; for a systematic review see Rogde et al., 2019), students in the ALPHA-French group show a higher overlap between their home language background and their language of literacy acquisition, a factor which might

counteract educational disadvantages, whereas their peers with comparable student background variables (ALPHA-French reference group) were identified as showing the highest percentage of students that are learning to read and write in a language (i.e., German), which has to be considered as linguistically further away (e.g., vocabulary, syntax, phonology) from their home language profile.

This potential advantage of learning to read and write in a language that is linguistically closer to their home language background discussed in international studies seems to be reflected in the results on **academic achievement**. The ÉpStan achievement tests in the students' respective language of literacy acquisition show that the students from the ALPHA-French group were able to answer a higher amount of items correctly in both listening comprehension (see *Figure 15*) as well as in early literacy (see *Figure 16*), compared to their peers with similar individual background characteristics (ALPHA-French reference group). This difference in favour of the ALPHA-French group could potentially be explained by the fact that these students completed the tests in French, a language which is linguistically closer to their home language background (i.e., French or Portuguese), whereas students from the ALPHA-French reference group completed the tests in German (i.e., listening comprehension) and Luxembourgish (i.e., early literacy), two languages which are linguistically further away from their home language background. Nevertheless, it is important to highlight that direct comparisons of the group results in the tests assessing the language of literacy acquisition have to be interpreted with caution (see 2.3.3 for details).

Results of the ÉpStan achievement tests in mathematics and Luxembourgish listening comprehension, which are directly comparable, indicated that most C2.1 students have solid basic skills in mathematics; an observation that was made irrespective of the students' home language background and their language of literacy acquisition. Although students from the ALPHA-German reference group and students at the national level seem to have slightly more advanced skills in Luxembourgish listening comprehension, group differences stayed below 10 % at level 1 and thereby indicate that most students have good basic skills in Luxembourgish listening comprehension. Taken together with the finding that Luxembourgish is the language students are the most frequently using when in contact with their friends (see *Figure 9*), and the teachers' perception that the pilot project fosters Luxembourgish as the main communication language, the good basic skills in Luxembourgish listening comprehension observed across students from all five groups indicate that Luxembourgish functions as an important communication language beyond *Cycle 1* and this also for students taking part in the pilot project.

Regarding **motivation and wellbeing**, a high majority of students from all five groups expressed a strong general academic motivation (see *Figure 17*) as well as a high academic wellbeing (see *Figure 20*) at the beginning of primary education. Although students from the ALPHA-French and the ALPHA-German groups are taught in mixed classes (i.e., consisting of students from both groups), in which

different student constellations are coming together for different subjects (see 1.2.2 for details), the results on wellbeing indicate that the students nevertheless perceived themselves as a cohesive class, in which they support each other. This perception is in line with the perception of teachers participating in the pilot project, stating that the project (rather) does not lead to a segregation between the language groups.

When it comes to **domain-specific academic motivation** in the language of literacy acquisition (see Figure 19), students in the ALPHA-French group showed higher academic interest related to enjoyment of their language of literacy acquisition. It thus appears that students in the ALPHA-French group are more motivated to learn and to read in a language that is linguistically closer to their home language background, compared to students learning to read and write in a language (i.e., German), which is further away from their language background. This observation seems particularly noteworthy in the light of national and international research findings that showed a positive relation between reading and later reading development (e.g., Stanovich, 1986), as well as in other school subjects, such as, for example, mathematics (e.g., Greisen et al., 2021; Paetsch et al., 2016).

Regarding domain-specific academic motivation in mathematics, ALPHA-French students expressed a considerably higher level of mathematics anxiety than students from all the other groups (see Figure 18); a perception which however does not seem to be directly reflected in their achievement in the domain of mathematics (see Figure 13). A potential explanation for this finding might lie in the French translation of the student questionnaire that was completed by the students from the ALPHA-French group. Whereas the French questionnaire is referring to the term of mathematics (i.e., "*J'ai peur des mathématiques*"), the German student questionnaire (completed by the other four groups) is referring to the conceptually less complex term of calculating (i.e., "*Ich habe Angst für dem Fach Rechnen*"). This divergent terminology might result in the fact that students who completed the questionnaire in German indicated to perceive less mathematics anxiety. Future studies should further investigate this finding by aligning the terminology used in both questionnaire versions in order to understand whether the higher anxiety is indeed related to the wording of the items or to other factors that differ between groups (e.g., teaching of mathematics in mixed classes consisting of both students from the ALPHA-French and the ALPHA-German group as a specificity of the pilot project).

Data from the parent questionnaire indicates that most parents of the ALPHA-French group and the ALPHA-German group are satisfied with the choice of their child's language of literacy acquisition (see Figure 22). Regarding **parental support**, parents from the ALPHA-French group indicated more often to perceive themselves as being able to support their child academically (e.g., in literacy acquisition, mathematics and when doing homework) due to their own language skills in French. This observation seems particularly noteworthy when compared to parents of students having comparable individual background characteristics (i.e., ALPHA-French reference group) that

perceived themselves less often able to support their child academically due to their own language skills in German. In light of research results showing that the parents' possibilities to support their child when it comes to school learning (e.g., doing homework, preparing for tests) positively relates to academic achievement (Bakker et al., 2007; Boonk et al., 2018), it can potentially be expected that students from the ALPHA-French group will specifically benefit from their parents' perceived ability to support them when learning during their educational career (e.g., higher achievement scores, lower grade repetition rates).

The parent questionnaire was furthermore able to show that approximately one third of the parents from the ALPHA-French reference group would have preferred French (32 %) as language of literacy acquisition for their child, followed by English (16 %). A comparable but slightly less pronounced pattern can also be observed for the ALPHA-German reference group and at the national level, where one third of parents would have opted for either French or English as language of literacy acquisition, if given the choice. These findings indicate that there is a certain demand among parents for a literacy acquisition in French and to a slightly lesser degree in English. Interestingly, this demand seems to be stronger in C3.1 and C4.1, as indicated by the percentage of parents with a French and Portuguese language background that would have opted for a literacy acquisition in French retrospectively (see *Annex*). This stronger demand in higher grades seems to be in line with the well-documented educational inequalities in Luxembourg, showing that students with a low SES and/or students speaking a language other than Luxembourgish and/or German at home are especially at risk of struggling academically in the Luxembourgish education system (Boehm et al., 2016; Hadjar et al., 2018; Hornung et al., 2021; Sonnleitner et al., 2021). In C3.1 and C4.1, a higher amount of parents with a French and Portuguese language background seem to perceive these academic challenges as potentially having an impact on their child's educational pathway (e.g., lower achievement, higher grade retention rates), which might be reflected in their expressed wish to have opted for a literacy acquisition in French or English in C2.1 instead of German.

7.2 STATISTICAL AND METHODOLOGICAL LIMITATIONS

Although the findings of the present report allow a first evaluation of the pilot project “Zesumme wuessen!”, they should be interpreted with caution due to a number of **important statistical and methodological limitations**, that are described in more detail in the following.

Limited comparability of results between the ALPHA-French and the other four groups: As it can be seen in *Table 1*, the ALPHA-French group consisted of $N = 48$ and the ALPHA-German group of $N = 65$ students. Considering that a certain sample size is required in order to validly scale the results of an academic achievement test on the so-called *ÉpStan* metric and that only students from the ALPHA-French group completed the two French achievement tests (i.e., French listening comprehension as well as *Premiers Pas vers l'Écrit*), it was not possible to scale these tests in the same way as the *ÉpStan*

achievement tests (i.e., Luxembourgish listening comprehension and mathematics), which were taken by the full cohort of students attending C2.1 (see 2.3.2 for details). The small sample size for the French tests, as well as the fact that the tests in the students' language of literacy acquisition differed slightly with regard to the number of items assessed (see *Figures 3 and 5*) and the specific content, imply that comparisons of French listening comprehension and *Premiers Pas vers l'Écrit* results of the ALPHA-French group with other groups have to be interpreted with caution (see 2.3.3 for details).

To reduce such statistical and methodological limitations in the future, a **stronger alignment** between the different ÉpStan achievement tests, as well as between the two different language versions of the student questionnaire, are currently foreseen. For example, as described in more detail in section 4.3.1, the results presented for the domain of early literacy could potentially be impacted by the language of test administration. Whereas the students in the ALPHA-French group, who are learning to read and write in French since the beginning of C2.1, completed the early literacy achievement test in French (***Premiers Pas vers l'Écrit***), all the other four groups completed the early literacy test in Luxembourgish (***Éischt Schrëtt zur Schrëftsprooch***) instead of their language of literacy acquisition, although they are learning to read and write in German since the beginning of C2.1. Considering that Luxembourgish is the main instruction language in *Cycle 1*, this might lead to the test being easier for these four groups as they completed it in a language they formally learned for two to three years (*Enseignement précoce* and/or *Enseignement préscolaire*) compared to the students from the ALPHA-French group, who only started to formally learn French at the beginning of C2.1. In addition, as described in more detail with regard to the difference in mathematics anxiety between the ALPHA-French and the other four groups, the current language versions of the student questionnaire are only partially comparable due to differences in the terminology that was used (e.g., the more complex term of “mathématiques” in French compared to the less complex term of “Rechnen” in German). Future assessments should thus aim at aligning the terminology used in the student questionnaire versions to allow a more sound statistical comparison between groups.

7.3 OUTLOOK AND FUTURE RESEARCH

Despite the described statistical and methodological limitations (e.g., small sample sizes of the ALPHA-French and ALPHA-German group, different test and questionnaire versions taken by different groups), the findings described in the present report offer a first important indication that the literacy pilot project “Zesumme wuessen!” could potentially contribute to encounter the existing educational inequalities in Luxembourg, which are assumed to result (at least partially) out of the high language expectations of the regular curriculum. In this context, the following **main findings in relation to a literacy acquisition in French** can be highlighted:

- (a) The $N = 48$ students from the ALPHA-French group showed **higher achievement scores in both ÉpStan tests assessing their language of literacy acquisition**, with a more pronounced difference

in listening comprehension, when compared to the ALPHA-French reference group consisting of students with comparable student background characteristics, all while having good basic academic skills in mathematics and in Luxembourgish listening comprehension.

- (b) The students from the ALPHA-French group furthermore reported to have a **higher domain-specific academic motivation to learn and to read in their language of literacy acquisition** (i.e., French) compared to domain-specific academic motivation of the students from the ALPHA-French reference group to learn and read in German, whereas perceiving higher academic anxiety in mathematics.
- (c) The parents of students from the ALPHA-French group **perceived themselves more often able to support their child academically** due to their own language skills in French, when compared to parents of students from the ALPHA-French reference group, who indicated to perceive themselves as less able to support their child academically due to their own language skills in German.

By continuously integrating the classes participating in the literacy pilot project into its well-established school monitoring programme, the ÉpStan will allow a more in-depth analysis of potential educational outcome differences between students pursuing their literacy acquisition in French compared to the students pursuing their literacy acquisition in German in the near future. Whereas the ÉpStan 2024/25 as well as the ÉpStan 2025/26 will generate cross-sectional data on the two future cohorts starting their literacy acquisition in C2.1, the ÉpStan 2025/26 will furthermore allow to follow the C2.1 students, whose results from the ÉpStan 2023/24 were presented in this report, longitudinally to the beginning of the next learning cycle (C3.1). More specifically, the longitudinal data analyses, which are foreseen to be published in the ALPHA Report 2026, will provide comprehensive insights into the developmental trajectories of the students participating in the pilot project in educational key domains (e.g., listening and reading comprehension in their language of literacy acquisition as well as mathematics) between C2.1 and C3.1; a time period which can be considered crucial for the subsequent academic careers of students (e.g., regular educational pathways versus grade retention).

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9. ANNEX

Figure 23 – Preferred Language of Literacy Acquisition by Home Language Background in C3.1

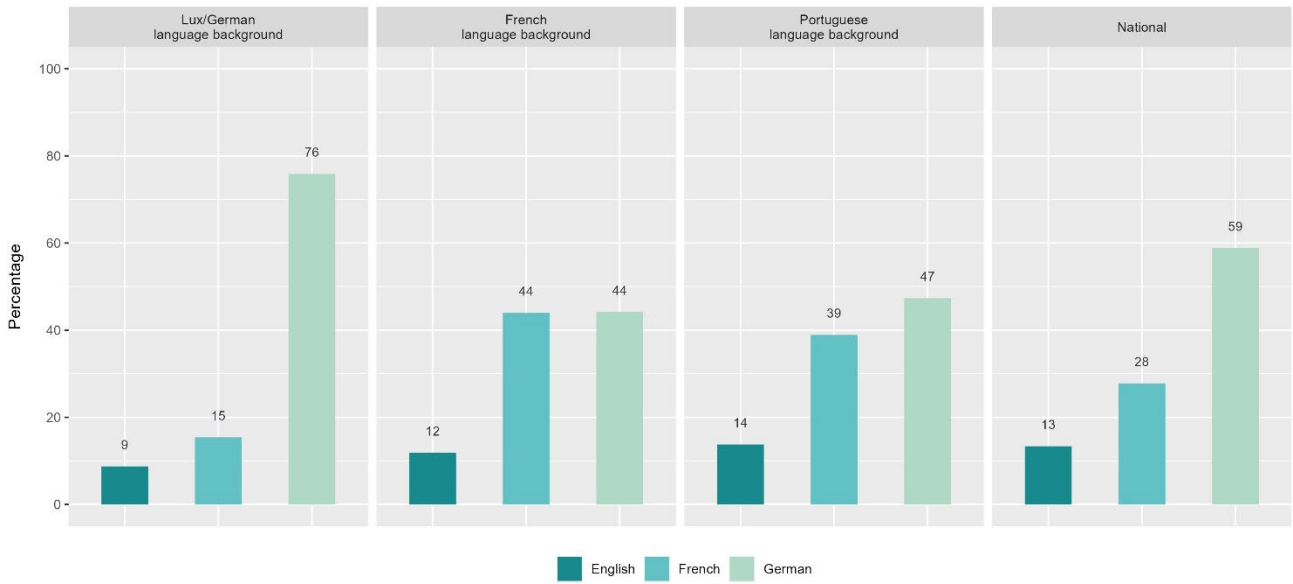
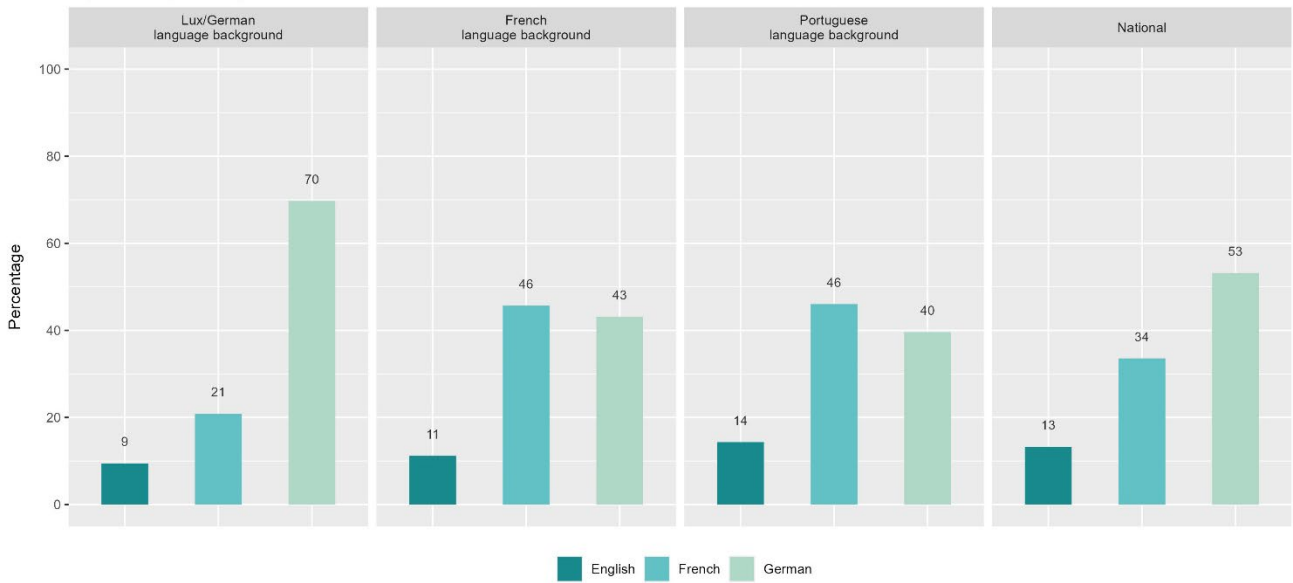
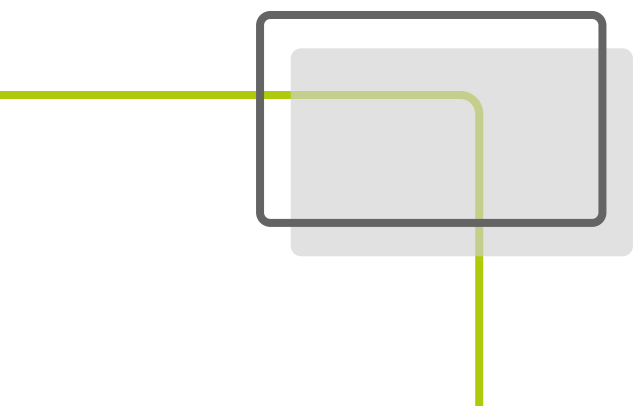


Figure 24 - Preferred Language of Literacy Acquisition by Home Language Background in C4.1





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