

# Spotlight on ESG-VP students - a new approach to testing

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## 1. Context of the study:

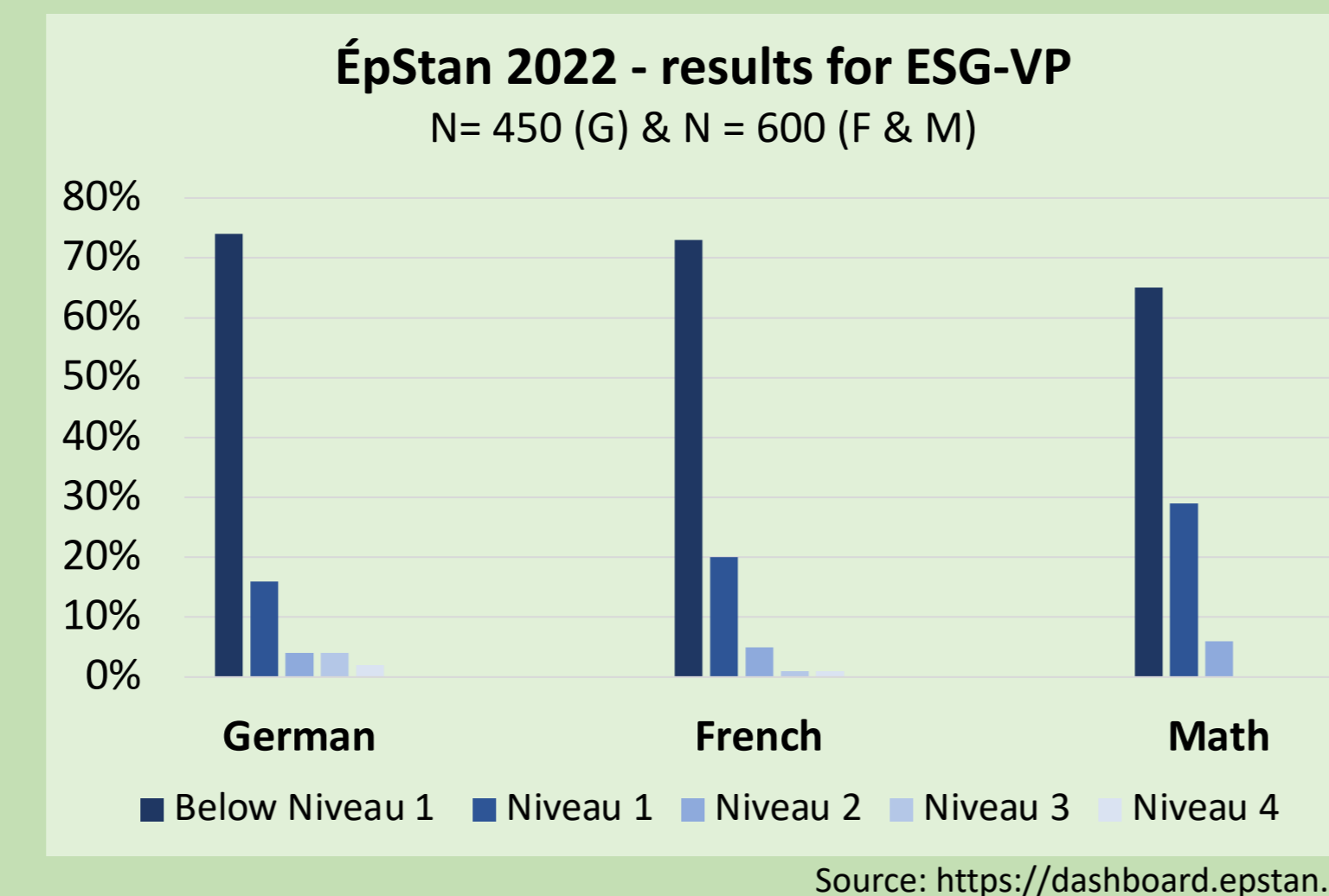
Main goal of ÉpStan in Grade 9: testing the competencies students are expected to have, in order to successfully complete their academic year.

E.g., ÉpStan level 2 for reading comprehension in French and German: *“The student can read linguistically, thematically, and structurally simple factual, functional, and media texts from his/her everyday life as well as literary texts.”* (MEN, 2008)

E.g., ÉpStan level 1 for math: *“Students can solve math problems that require the application of only one procedure.”* (Sonnleitner et al., 2018; MEN, 2019)

But the tests are highly challenging for the vast majority of VP students: they stay below ÉpStan Niveau 1, and we don't know much about their basic reading and math competencies.

Therefore, the present study puts these VP students in the spotlight and reveals what they can do!



## 2. Objectives:

1. Fine-tuning of ÉpStan competency tests.
2. More concrete description of ESG-VP students' reading and math abilities & better feedback (more tangible and positively stated).
3. Increased motivation and chance for students to show their proficiency level.
4. In the long run: better-tailored interventions for ESG-VP students.

## 3. Research question, study design & item examples (G/F/M):

**Research question: How to design reading and math items that better reflect ESG-VP students' math and reading competencies?**

Study design for languages based on 1) German study on different levels of functional illiteracy amongst adults (Grotlüschen & Riekmann, 2011; id., 2012) and 2) on expert knowledge and experiences of teachers from Luxembourg:

Level 0.1: decoding of single words (VP modules 1-2)

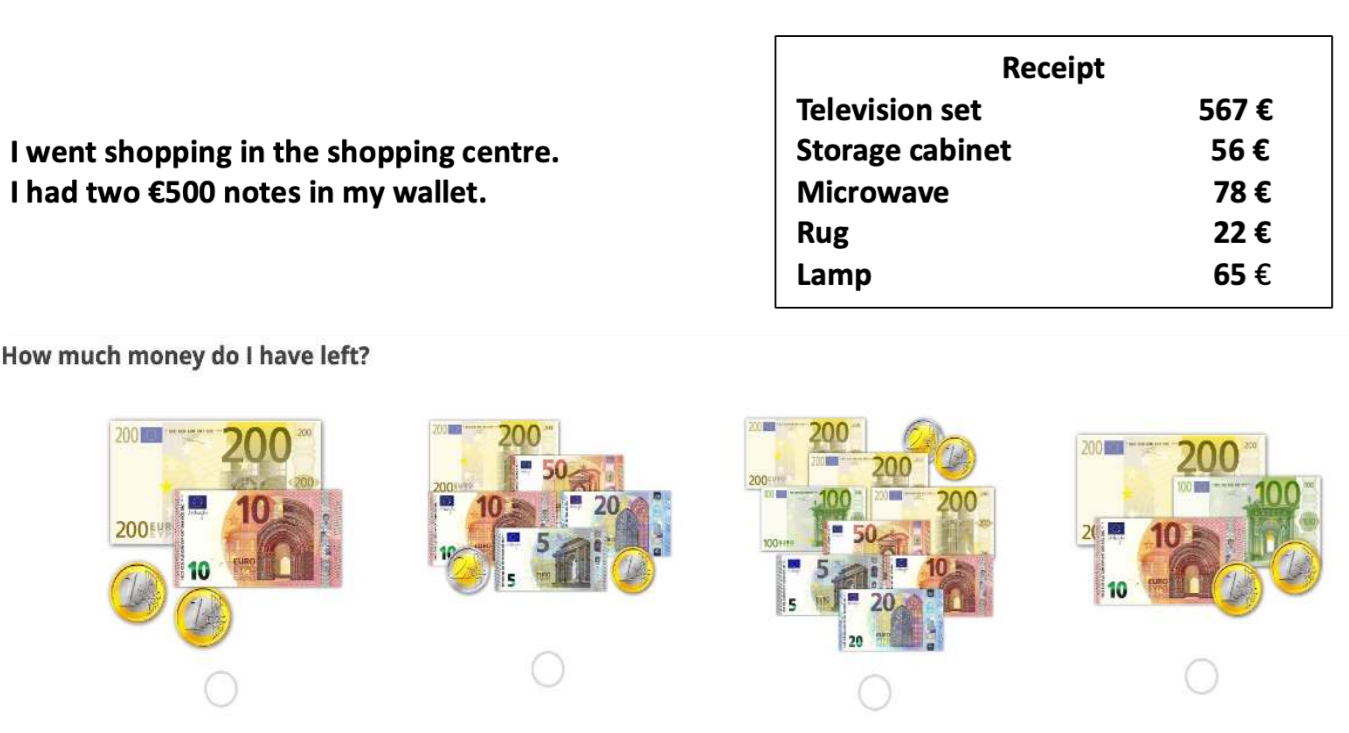
Level 0.2: decoding of single sentences (VP modules 2-3) **For examples, see section 4!**

Level 0.3: decoding of short texts (VP modules 3-4)

Study design for math: items reflecting the ESG-VP curriculum (Modules 1-5):

I went shopping in the shopping centre. I had two €500 notes in my wallet.

How much money do I have left?



Example: Math, module 1

Two friends had breakfast together at the Downtown Café. Here is the receipt:

The Downtown Café

Coffee with milk	2.55 €
Coffee	2.15 €
Croissant	1.25 €
Apple turnover	1.80 €
Orange juice	3.45 €
Ham roll	4.20 €
Cheese roll	4.20 €

They pay with a 50 € banknote. How much money will the waiter give them back? \_\_\_\_ €

Example: Math, module 3

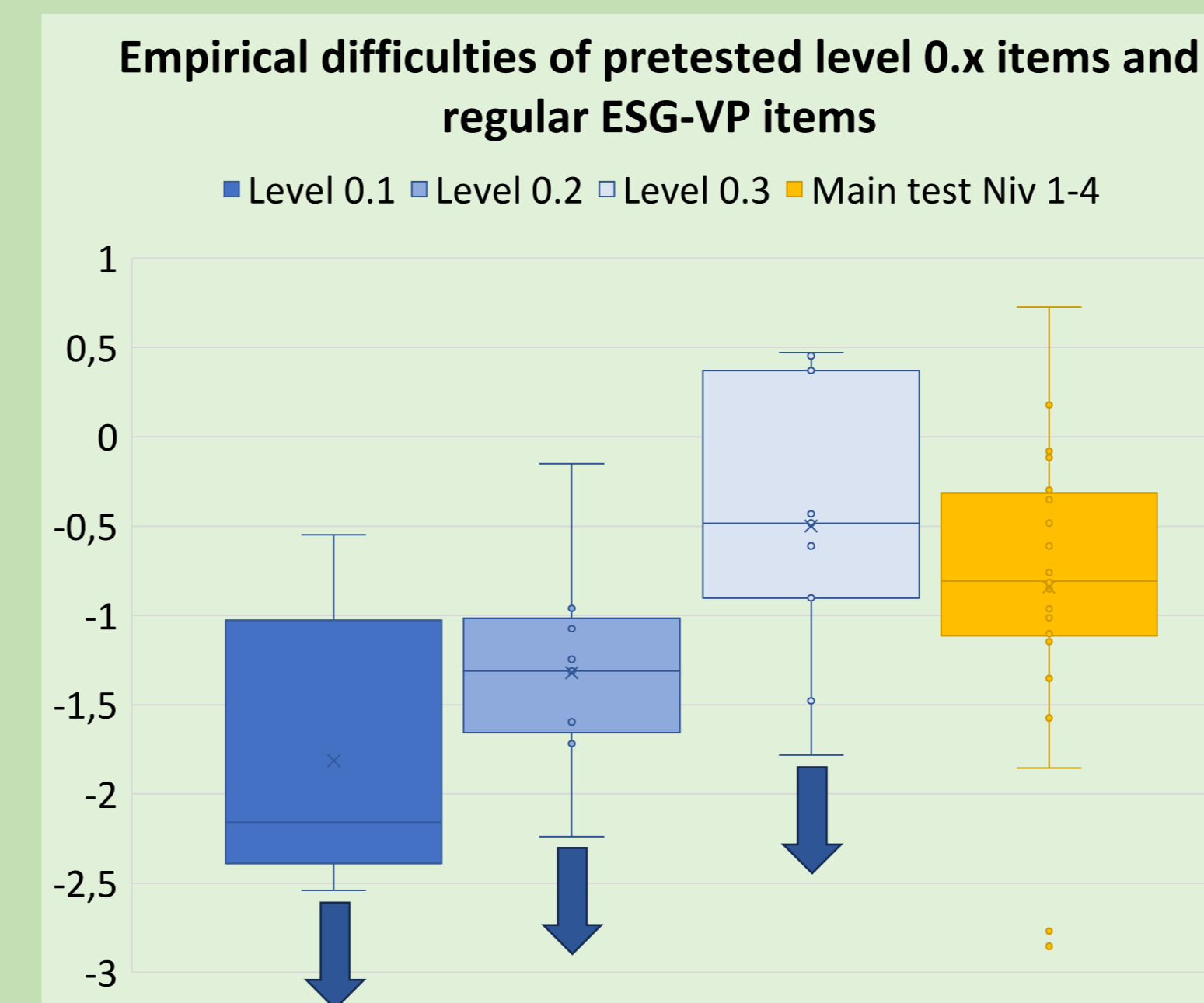
A farmer has enough food to feed 20 cows for 40 days. If he only had 10 cows, how long would the food last?

20 days  
 30 days  
 70 days  
 80 days

Example: Math, module 5

## 4. Methods and first results for German (2022):

Tasks were administered online using the web-based platform OASYS. Students responded on laptop or desktop computers to 27 main test tasks and to up to 16 pretest tasks in a closed answer format. Test time was restricted to 45 minutes for the main test and to 25 minutes for the pretest. Task difficulties are based on ÉpStan main test 2022 (n = 6699) and ÉpStan pretest data (n = 242). Tasks were unidimensionally scaled using a 1-PL model within the R-package “TAM”, task difficulties range typically from -3 to 3 logits.



### Key insights:

- Different theoretical task levels show clearly distinguishable empirical difficulties.
- Empirical **pretest difficulties** are **on average 0.8 higher** on ÉpStan scale **than main test difficulties** (pretest taken at the end of a long test morning: lower motivation; higher % of missing answers)!
- Considering that, level 0.x tasks broaden the difficulty spectrum compared to regular ÉpStan main test tasks for ESG-VP students.
- Rational-based task development allows for more fine-grained assessment of lower reading skills.

At the school cafeteria

Monday	Tuesday	Wednesday	Thursday
Soup	Cucumbers	Carrot salad	Salad
Pasta	Turkey	Fish	Omelette
Cheese	Potatoes	Barley	Rice
Chocolate pudding	Green beans	Broccoli	Courgette
	Donuts	Yogurts	Compote

Which day do students eat fish?  
 Monday  Tuesday  Wednesday  Thursday

Example: Level 0.1: decoding of single words

How to make homemade lemonade

1. Squeeze the juice of 4-6 lemons into a pitcher.
2. Dissolve 1 cup of sugar in 1 cup of warm water to make a syrup.
3. Combine the syrup with 5 cups of cold water in the pitcher.
4. Stir well and serve with ice.

Enjoy your lemonade!

Put the different steps in order.

Step 1: \_\_\_\_\_  
Step 2: \_\_\_\_\_  
Step 3: \_\_\_\_\_  
Step 4: \_\_\_\_\_

Add ice. Make the syrup. Squeeze the lemons. Stir well.

Example: Level 0.2: decoding of single sentences

Today is the day - Simon turns 18! Jason, Pit and Sara celebrate with him. Initially, they planned to go to the seaside after school and go swimming. But it's too cold for that today. So they meet in Sara's garden and enjoy themselves: they listen to music, eat chips and cake and have a good time. Too bad Marco can't join them. He is still on vacation with his new girlfriend Mira. Jason and Pit send him funny photos and videos of the party to his mobile phone. Marco sends back smileys and pictures of the sights he and Mira recently visited.

What would be the best title for this text?

<input type="checkbox"/> Ana and Simon
<input type="checkbox"/> Ana's mobile phone
<input type="checkbox"/> Simon's birthday party
<input type="checkbox"/> Fun at the seaside

Example: Level 0.3: decoding of short texts

## 5. Outlook:

First results for French and math will be available in spring 2024 (drawn from ÉpStan pretest in autumn 2023), building the base for future research and test development in Grade 9.

## 6. Limitations:

- Background variables (SES, gender, language spoken at home, migration background) have not yet been exploited. But we know from past studies, that ESG-VP students form a rather heterogeneous group whose weak academic performances are typically due to an interplay of several unfavourable factors.
- Due to study design (online assessment), questions measuring reading skills on word level require reading skills beyond that level.

## 7. Literature (selection):

- Grotlüschen, A.; Riekmann, W. (2011): leo. – Leve-One Studie, Literalität von Erwachsenen auf den unteren Kompetenz-niveaus. Presseheft, Universität Hamburg.
- Grotlüschen, A.; Riekmann, W. (2012): Funktionaler Analphabetismus in Deutschland. Ergebnisse der ersten leo. – Level-One Studie. Münster: Waxmann.
- MEN (2008). Bildungsstandards Sprachen. Leitfaden für den kompetenzorientierten Sprachenunterricht an Luxemburger Schulen. Luxembourg: MEN.
- MEN (2019). Mathématiques, Référentiel de compétences pour la voie préparatoire.
- MEN (2020). Dossier d'information. La voie de préparation de l'enseignement secondaire général.
- Sonnleitner, P., Krämer, C., Gamo, S., Reichert, M., Muller, C., Keller, U. & Ugen, S. (2018). Schülerkompetenzen im Längsschnitt – Die Entwicklung von Deutsch-Leseverstehen und Mathematik in Luxemburg zwischen der 3. und 9. Klasse. In LUCET & SCRIPT, Nationaler Bildungsbericht Luxemburg 2018 (S. 39–58). Luxembourg: LUCET & MEN.