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**Publication date**  
2022

[Link to publication](#)

#### **Citation for published version (APA):**

Spit, S. B., Ryan, O., & Andringa, S. J. (2022). *Investigating the relation between second language proficiency and study success using a causal inference approach..*

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# Investigating the relationship between second language proficiency and study success using a causal inference approach

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## Language and education

Language proficiency key in study success (Brown & Hudson, 2002)  
Strong relation in international students too (Daller & Phelan, 2013)  
But: mainly investigated for tertiary education (Hu & Trenkic, 2019)

## Causality

Difficult to make causal inferences from observational data (Hernán, 2018)  
Experiment do allow for causal statements  
Directed Acyclic Graphs (DAGs) can help us clarify our assumptions when making causal inferences from observational data (Pearl, 2009)

## Research questions

1: Is there a relation between language proficiency in L2 and study success, and does this relation differ across educational contexts?

2: Can we use observational data to make any inferences about a possible causal relation between language proficiency and study success?

## Staatsexamen NT2

### Background

Statewide organised entrance exam for language at B1 and B2 level  
Administered from 1992 onwards (Hulstijn, 1991)  
Requirement for educational programs and by employers  
Proposed to have an emancipatory effect (Janssen-van Dieten, 2012)  
Many thousands of participants every year (Staatsexamens NT2, 2020)

### Data source

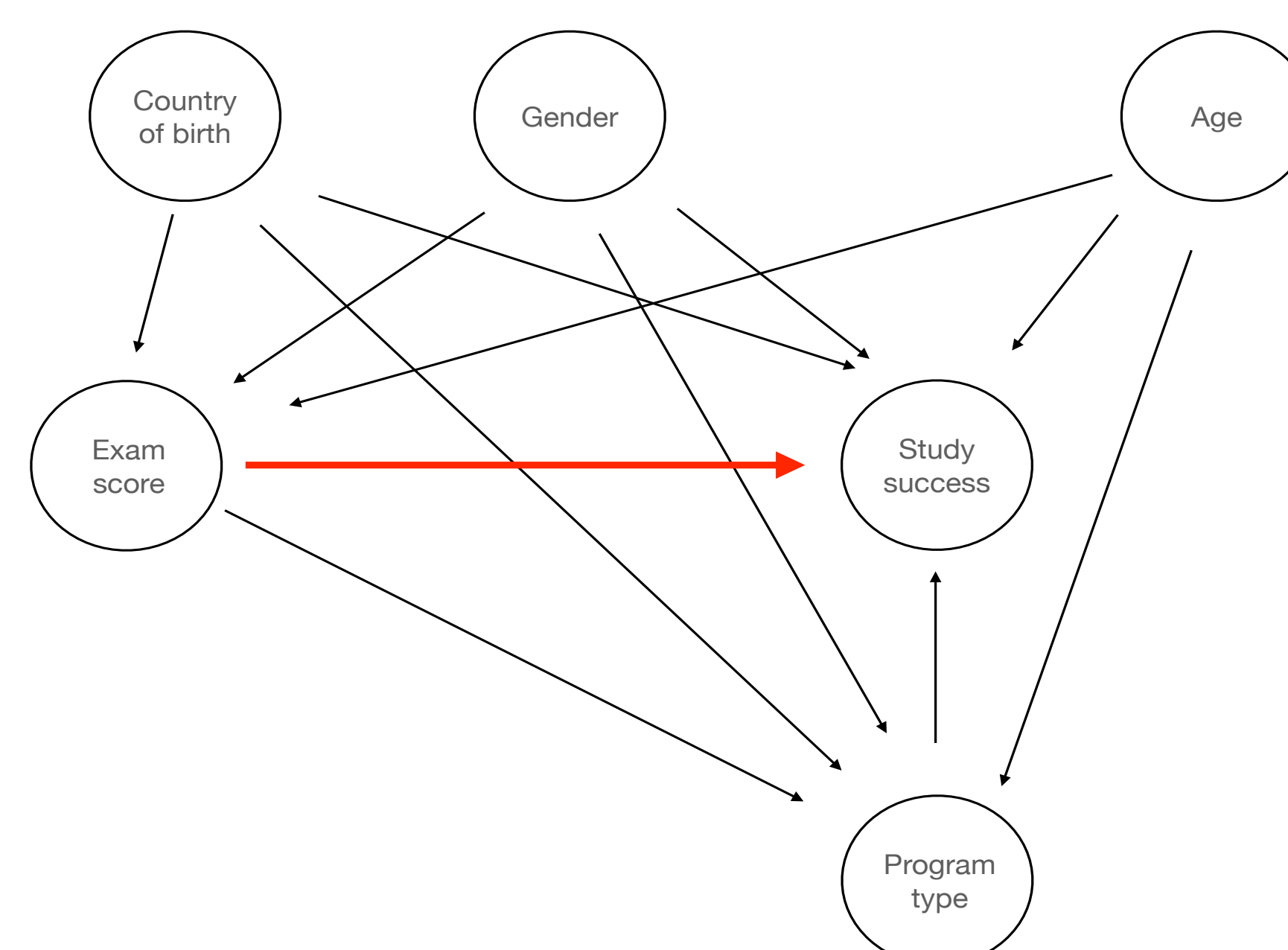
Dienst Uitvoering Onderwijs (DUO) &  
College voor Toetsen en Examinering (CvTE)  
have data available about examinees  
and their educational careers

### Available data

Study success: finished study program or not  
Exam score: Averaged scores from four subtests (>500)  
Level of examination: B1 or B2  
Program type: MBO1/2, MBO3/4, HBO and WO  
Age: years  
Gender: Fe(male)  
Country of birth: Western or non-Western country of birth (CBS, 2020)

## Analysis

### DAG



### Statistical model

Logistic regression for B1 and B2 examinees separately

Study Success ~ Exam score + Program type +  
Country of birth + Gender + Age

Contrast coding for non-continuous variables

Exam score:  
>550 vs 520-550; >520 vs 500-520

Program type:  
(WO vs HBO, WO/HBO vs. MBO3/4, WO/HBO/MBO3/4 vs MBO1/2)

## From here...

We expect that study success is positively related to language scores, and that this relation is stronger for higher educational programs

We submitted this plan as a Registered Report

DAGs can contribute to more transparent data-analysis when working with observational data, which is key in research that might have big societal impact

OCW has interest in experimenting with causal inference for better evidence based policy

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