

Psychosocial Factors, Level of Mathematics and Progression in an Access Programme

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Introduction



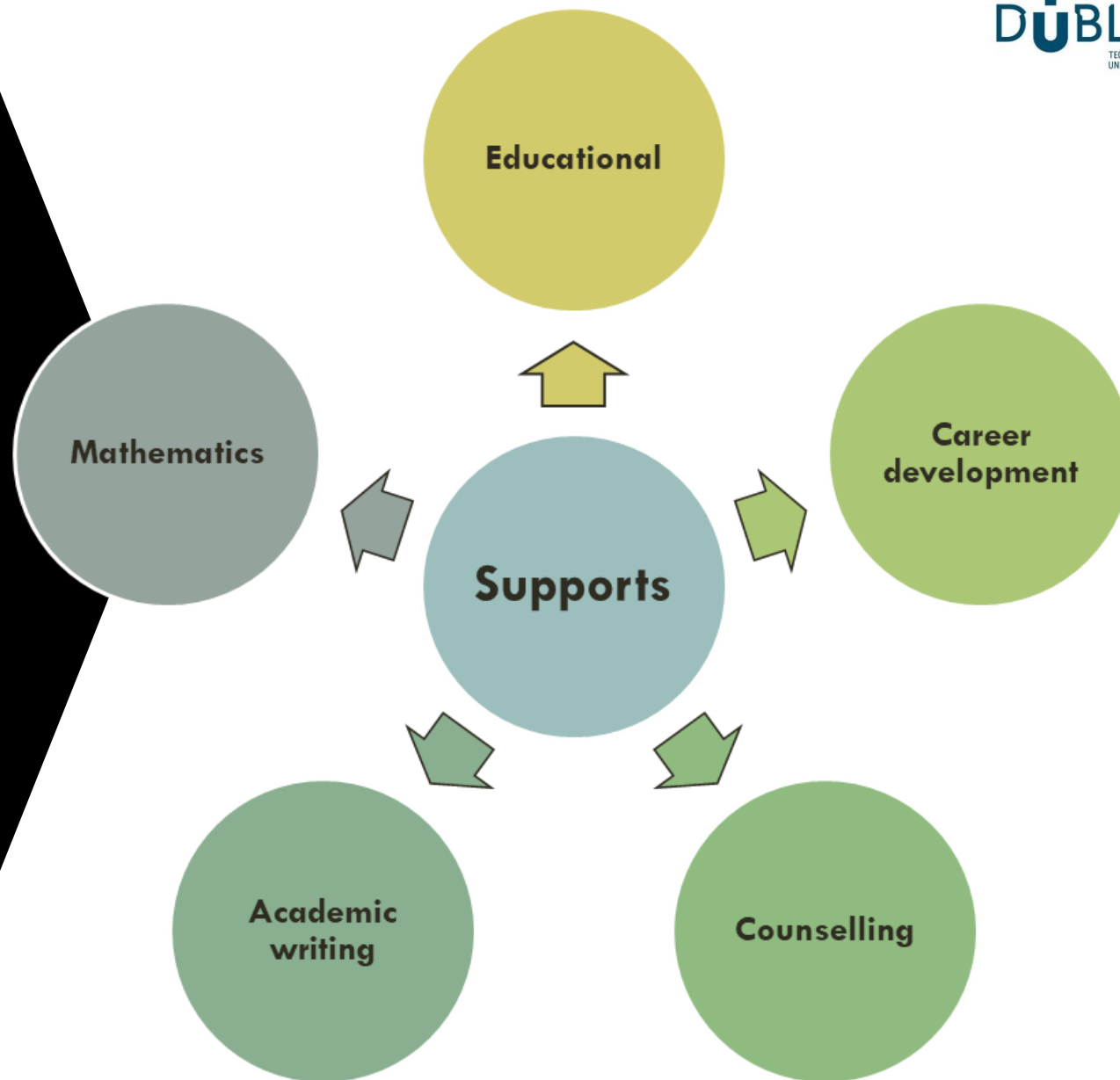
A three-year study (2017 – 2020) examined the factors affecting the progression of Access students at TU Dublin to undergraduate studies.

Access programmes offer an alternative route to higher education for under-represented students

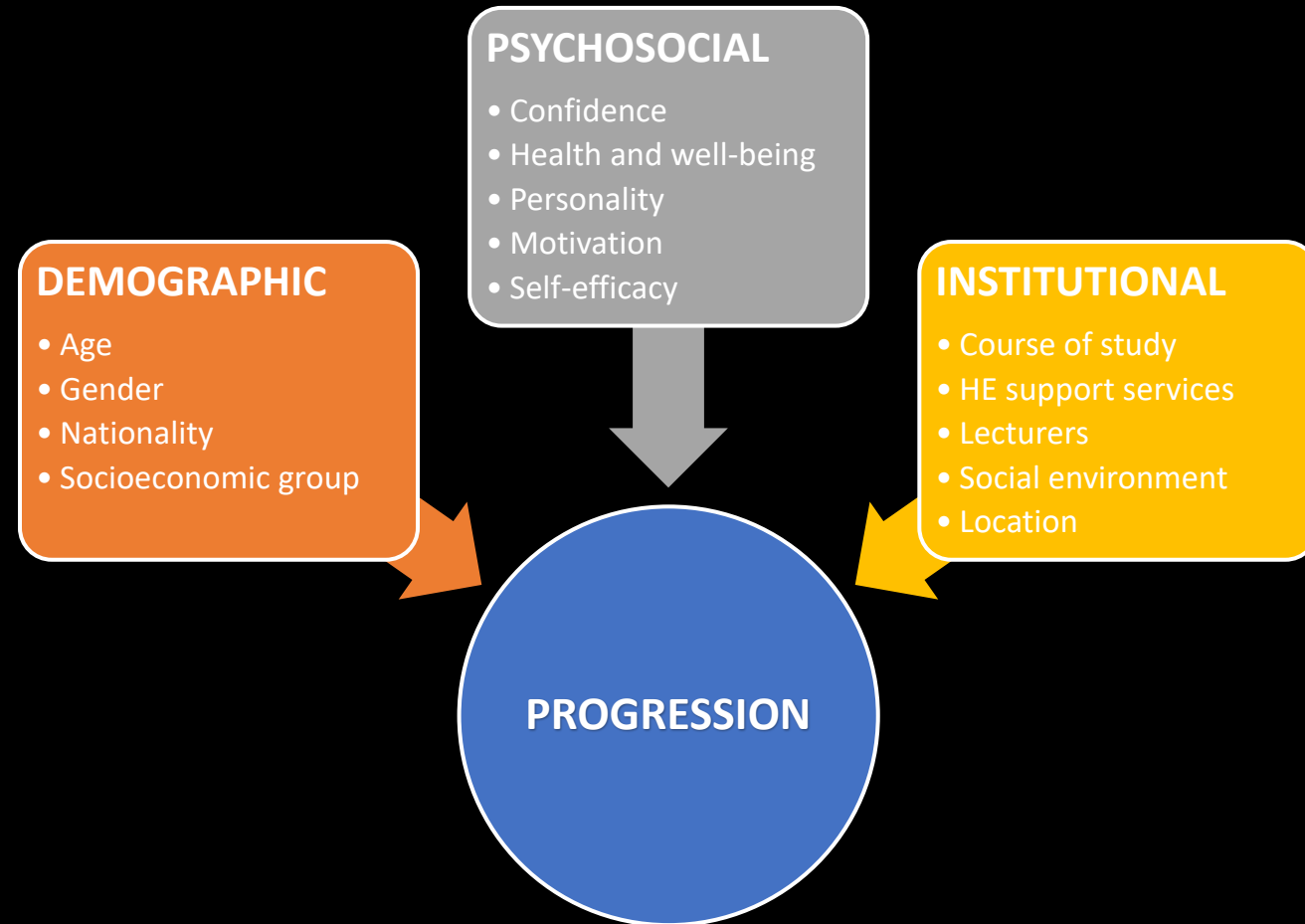


Programme TU Dublin

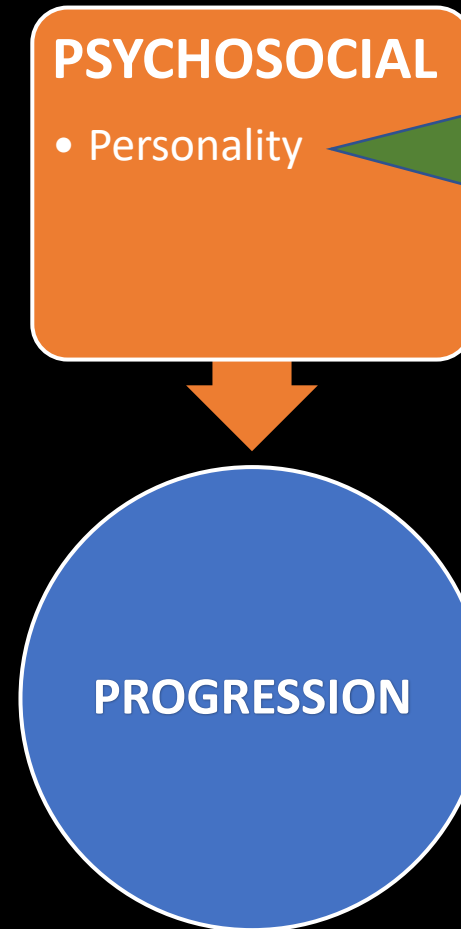
- One-year programme
- For mature students (23 years and over) and socioeconomically disadvantaged young adult students (less than 23 years)
- Provides students with a variety of supports



Literature Review

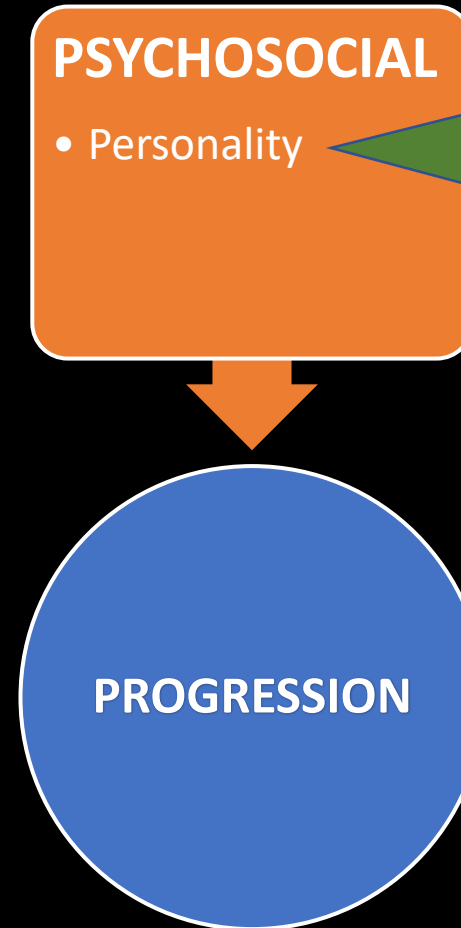


Literature Review



The personality traits of conscientiousness and openness have been found to affect students' grades in mathematics

Literature Review

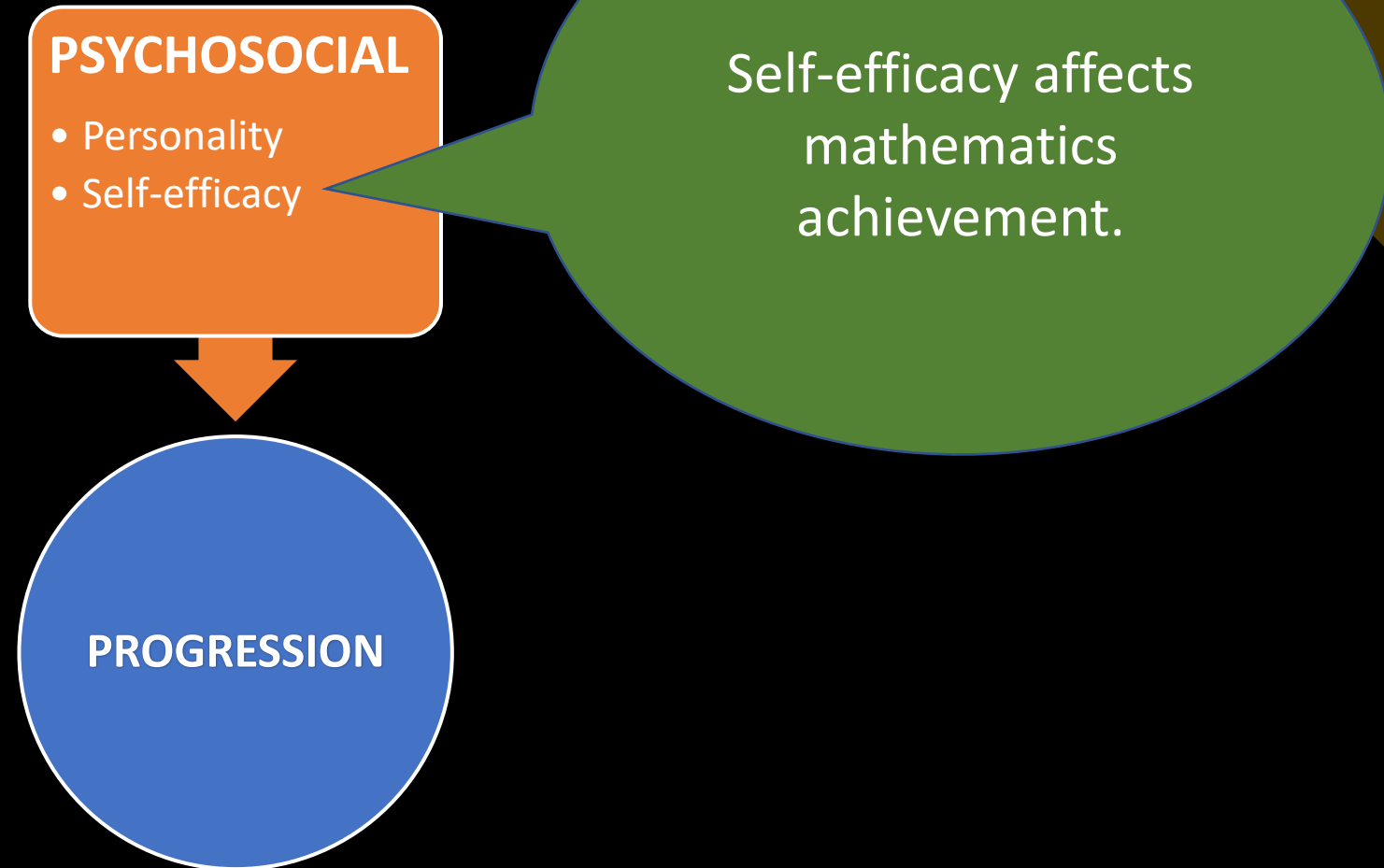


The personality traits of conscientiousness and openness have been found to affect students' mathematics grades

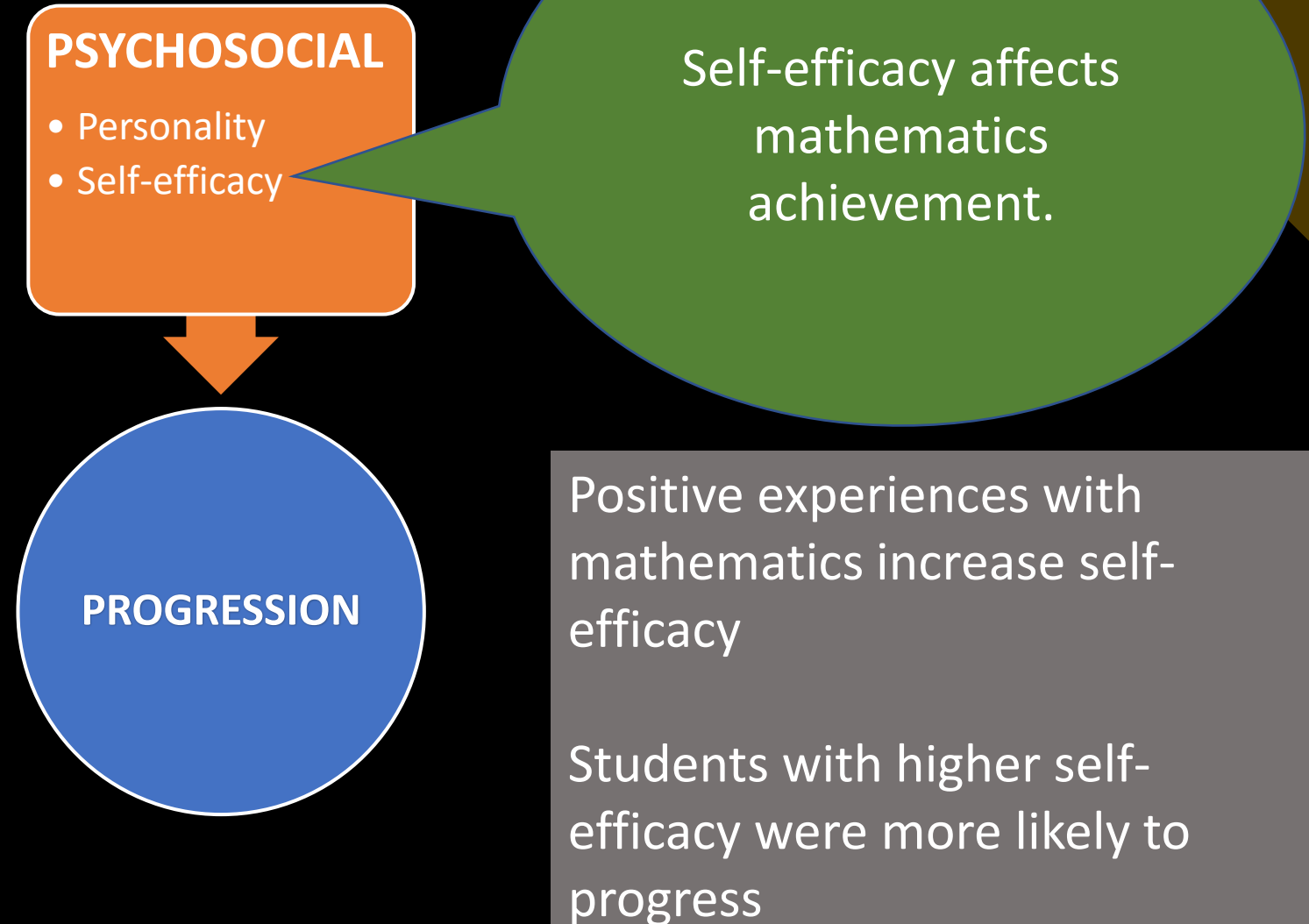
Conscientiousness – Consistent and thorough learning

Openness – Deep learning

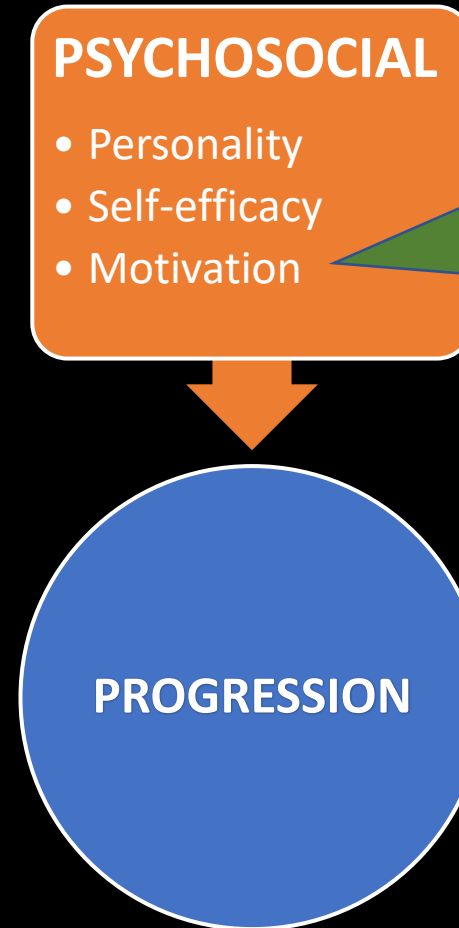
Literature Review



Literature Review

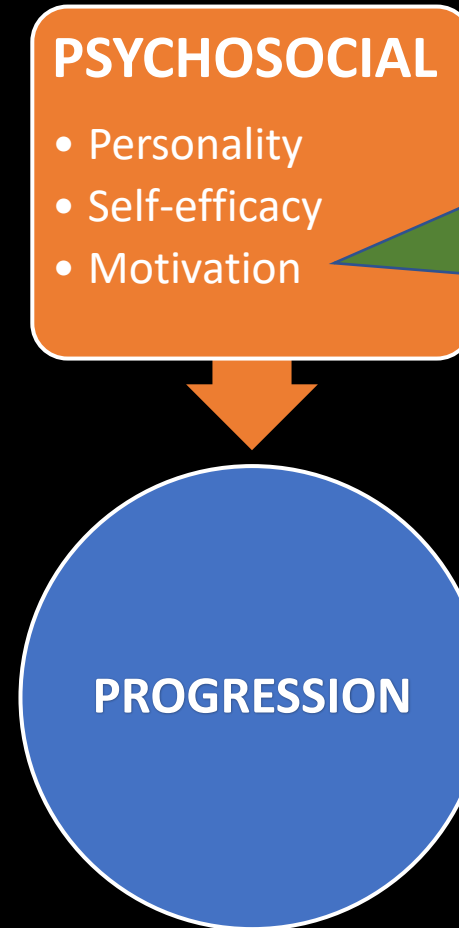


Literature Review



Lower intrinsic motivation has a negative affect on performance and progression

Literature Review



Lower intrinsic motivation has been found to negatively affect performance and progression

There is a positive relationship between mathematics self-efficacy and students' intrinsic motivation and progression

Research Question

Is there a relationship between psychosocial factors, Access students' mathematical experiences and their progression to undergraduate studies?



Methodology

Mixed
methods

Explanatory
sequential
mixed methods

Methodology

Mixed
methods

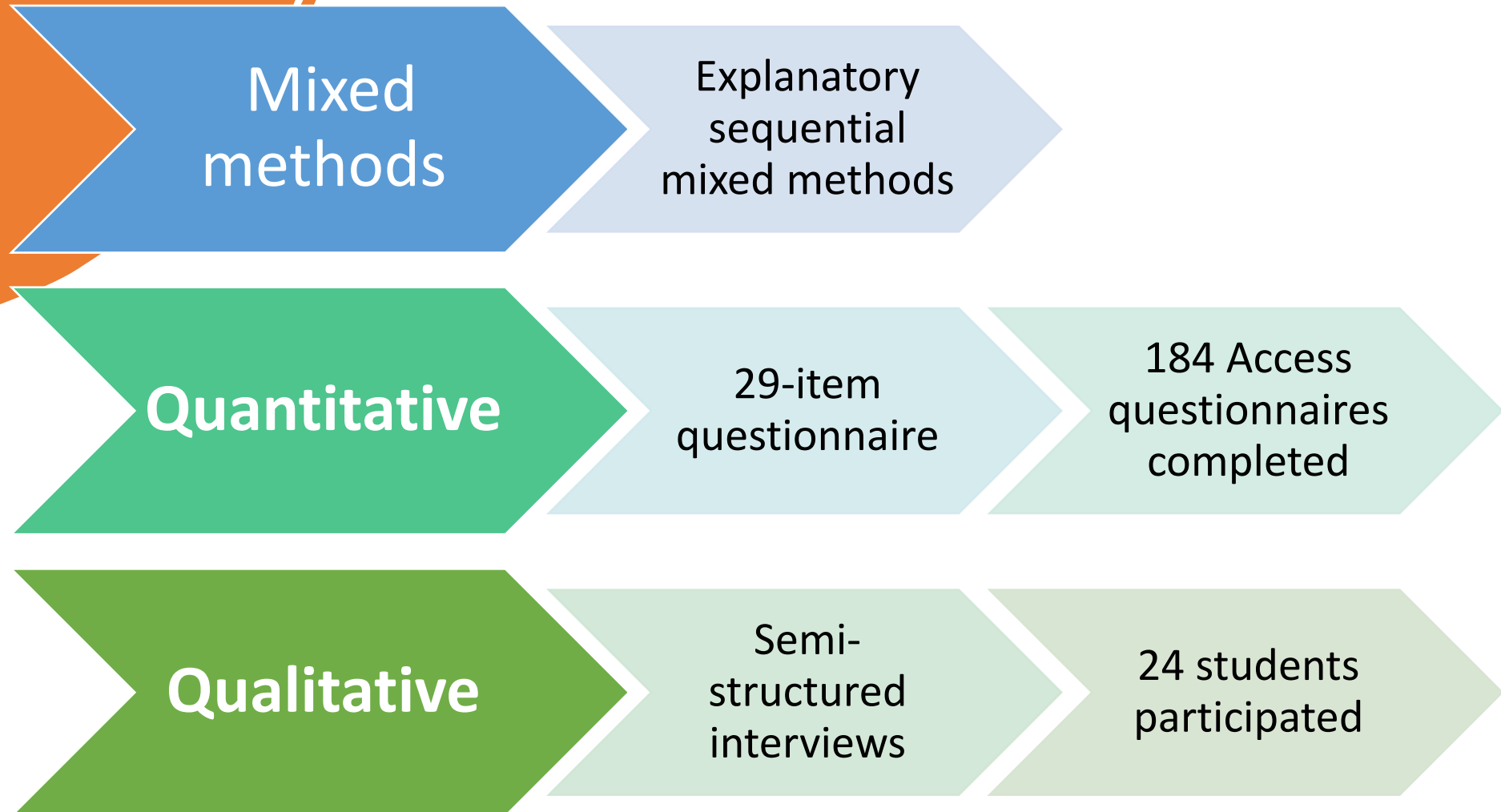
Explanatory
sequential
mixed methods

Quantitative

29-item
questionnaire

184 Access
questionnaires
completed

Methodology



Methodology

Mixed
methods

Explanatory
sequential
mixed methods

Quantitative

29-item
questionnaire

184 Access
questionnaires
completed

Qualitative

Semi-
structured
interviews

24 students
participated

Questionnaire

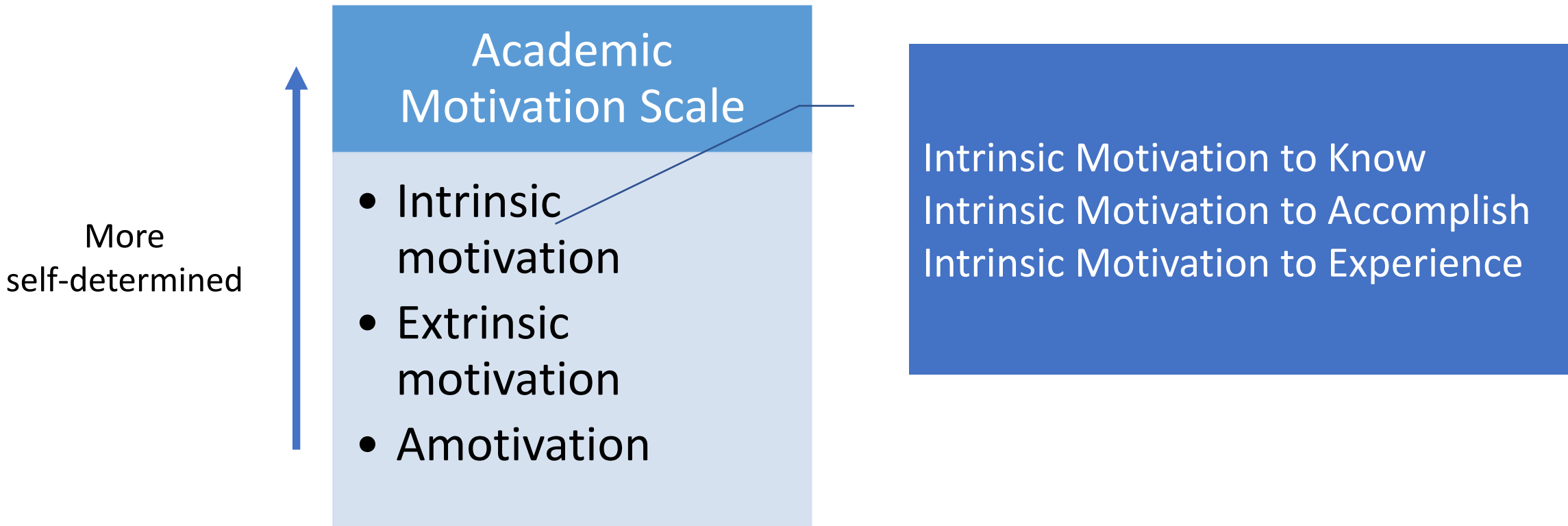
- Three validated scales: the Academic Motivation Scale (Vallerand et al., 1992)

Academic Motivation Scale

- Intrinsic motivation
- Extrinsic motivation
- Amotivation

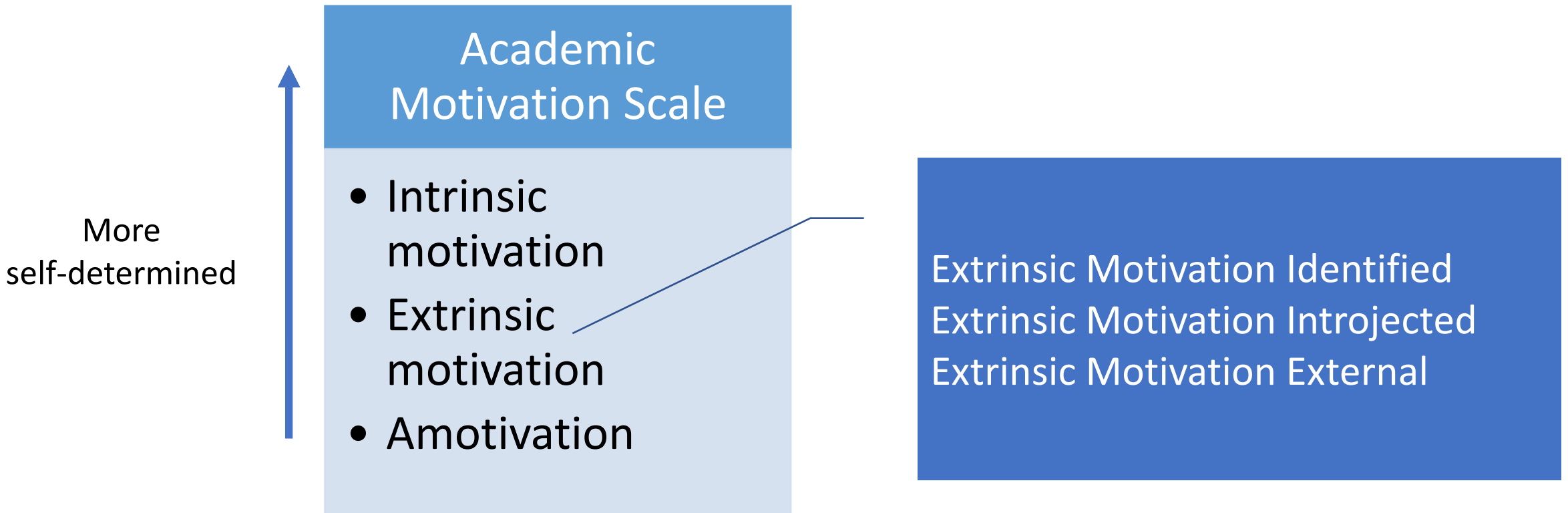
Questionnaire

- Three validated scales: the Academic Motivation Scale (Vallerand et al., 1992)



Questionnaire

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Questionnaire

- Three validated scales: the Academic Motivation Scale (Vallerand et al., 1992), the Big Five Inventory (John & Srivastava, 1999) and the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995).
- A scale measuring belief in mathematics ability

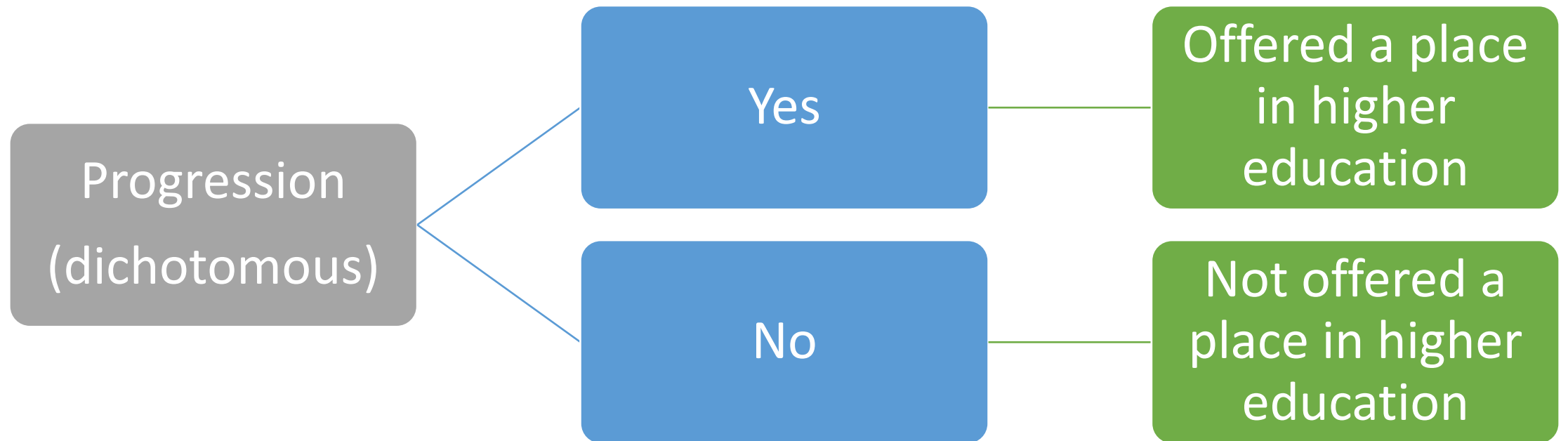
Academic Motivation Scale

- Intrinsic motivation
- Extrinsic motivation
- Amotivation

Big Five Inventory

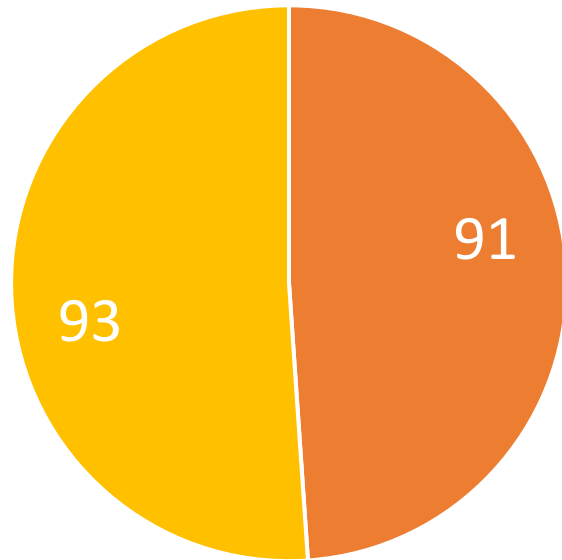
- Extraversion
- Agreeableness
- Conscientiousness
- Neuroticism
- Openness

Measurement of Progression



Results - Demographics

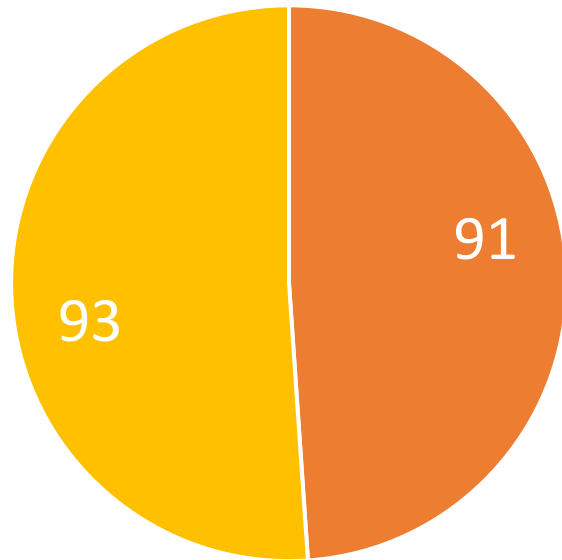
Gender



Female Male

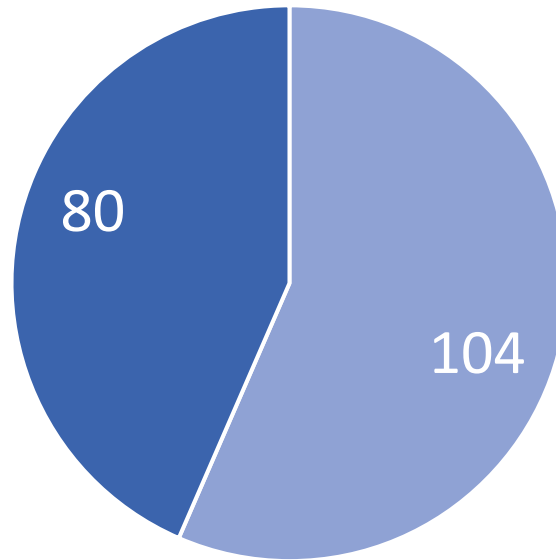
Results - Demographics

Gender



Female Male

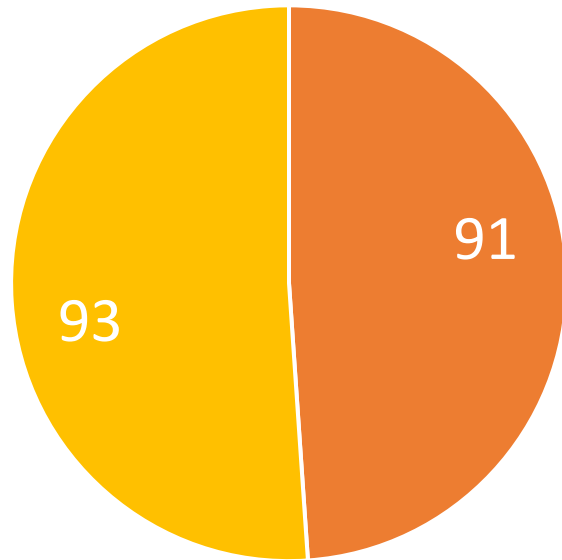
Age



Mature Young Adult

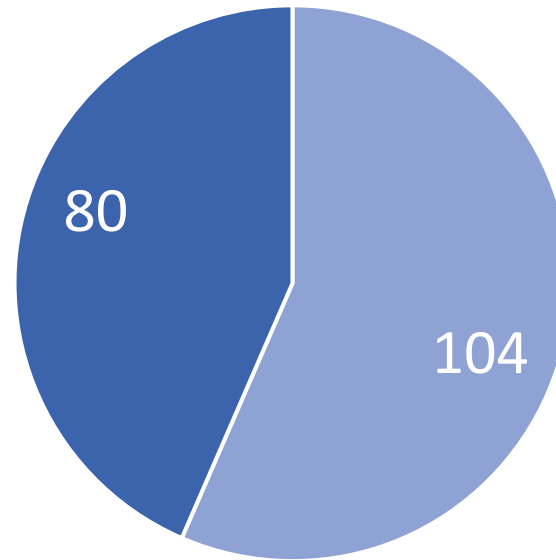
Results - Demographics

Gender



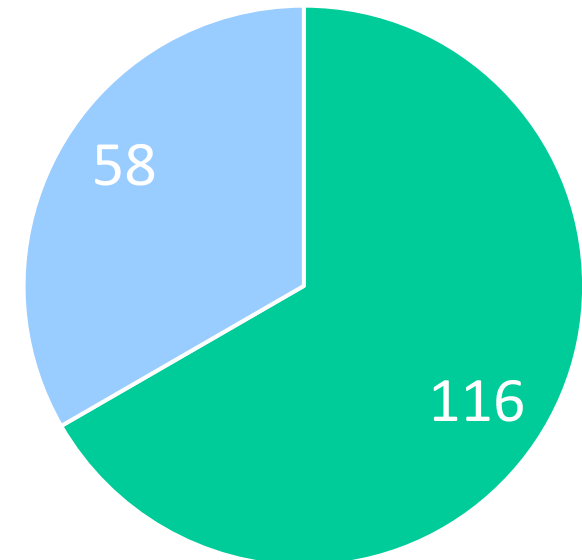
Female Male

Age



Mature Young Adult

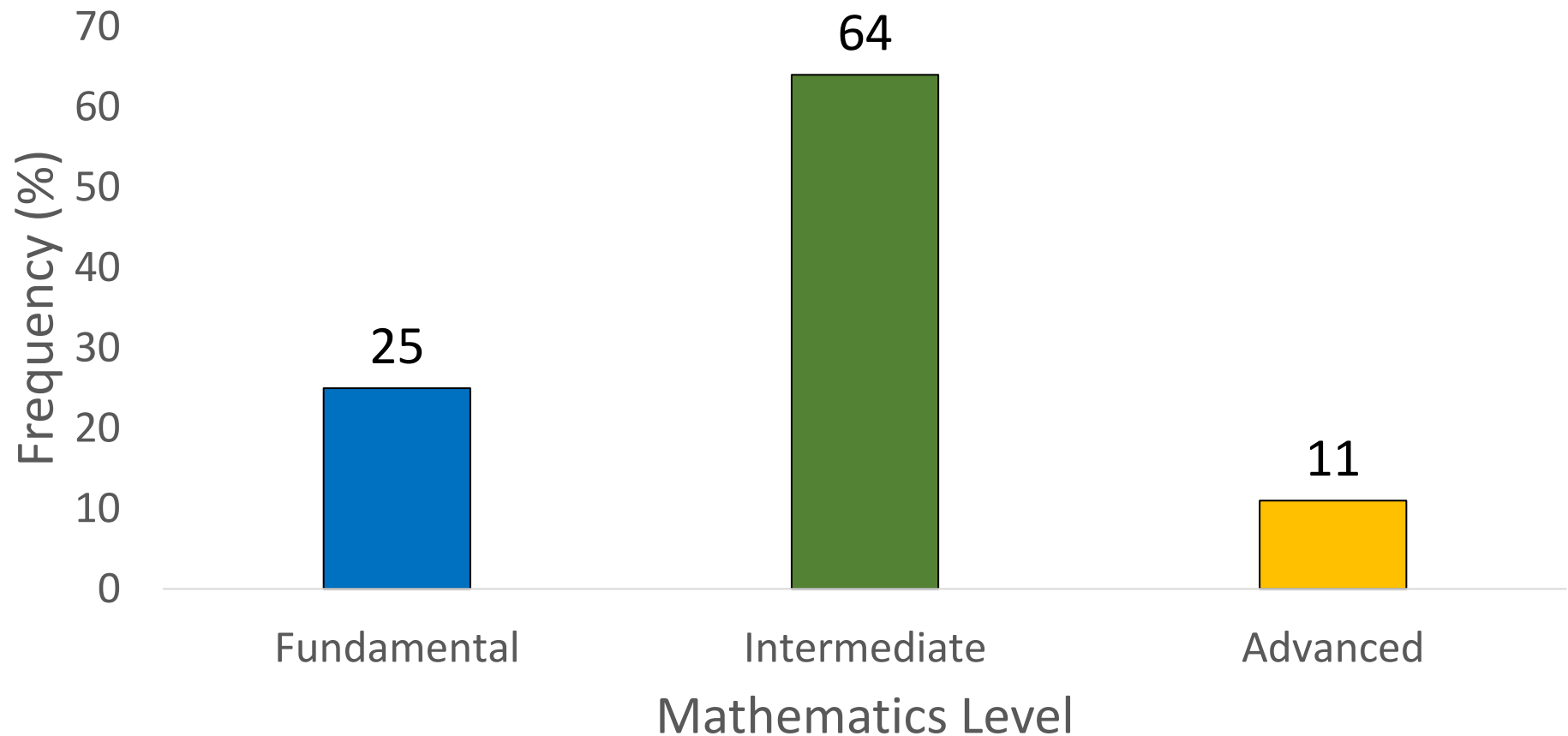
Nationality



Irish national
Non-Irish national

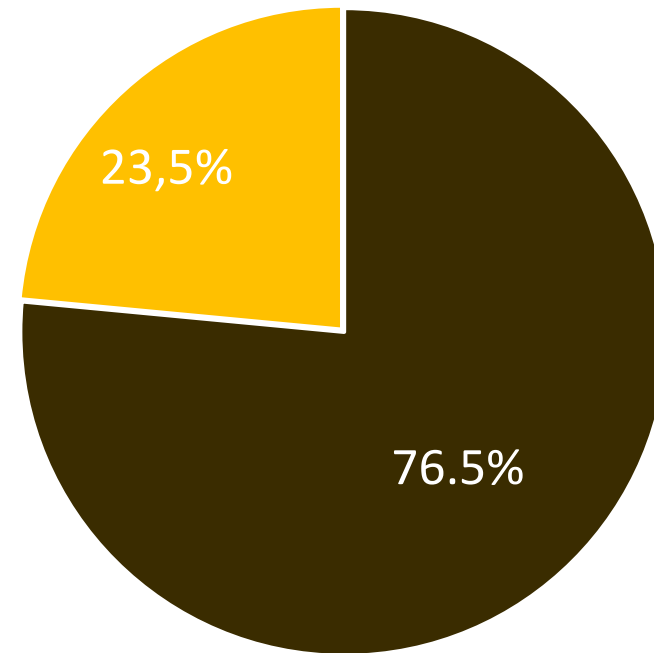
Results – Mathematics Levels

All Access students completed a mathematics module in fundamental, intermediate or advanced mathematics.



Results - Demographics

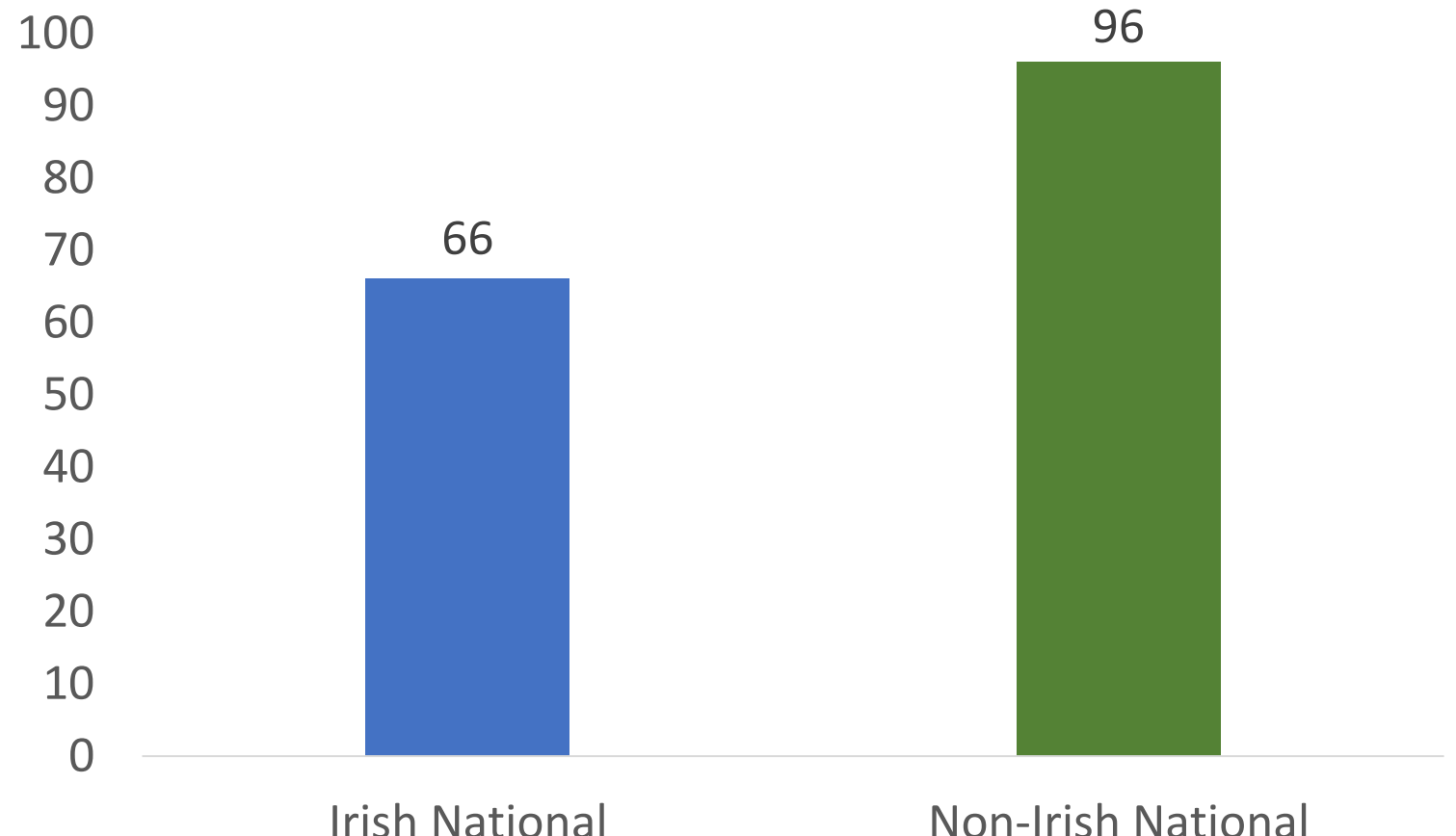
- Males were significantly more likely to study advanced mathematics ($\chi^2 = 3.75$, $df = 1$, $p = .053$).



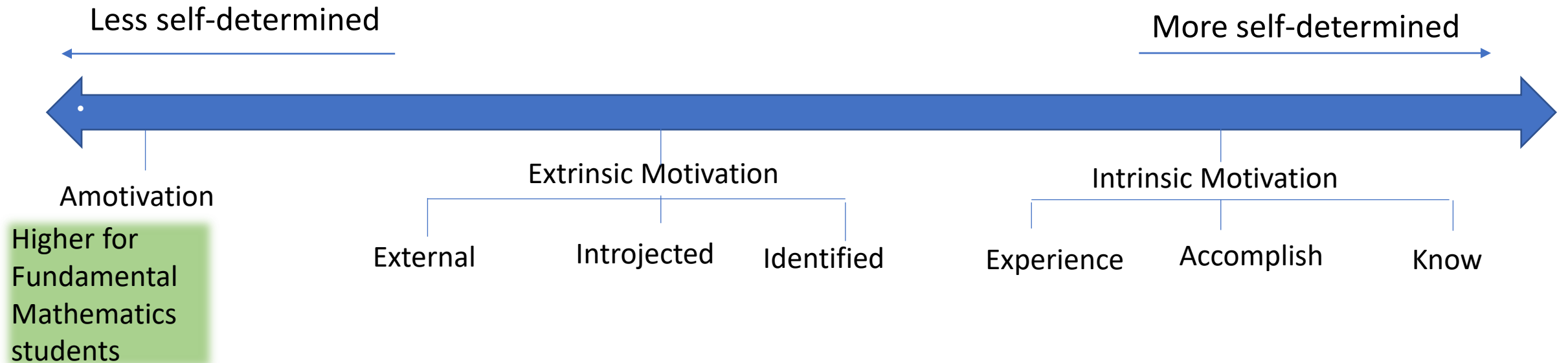
■ Male ■ Female

Results - Demographics

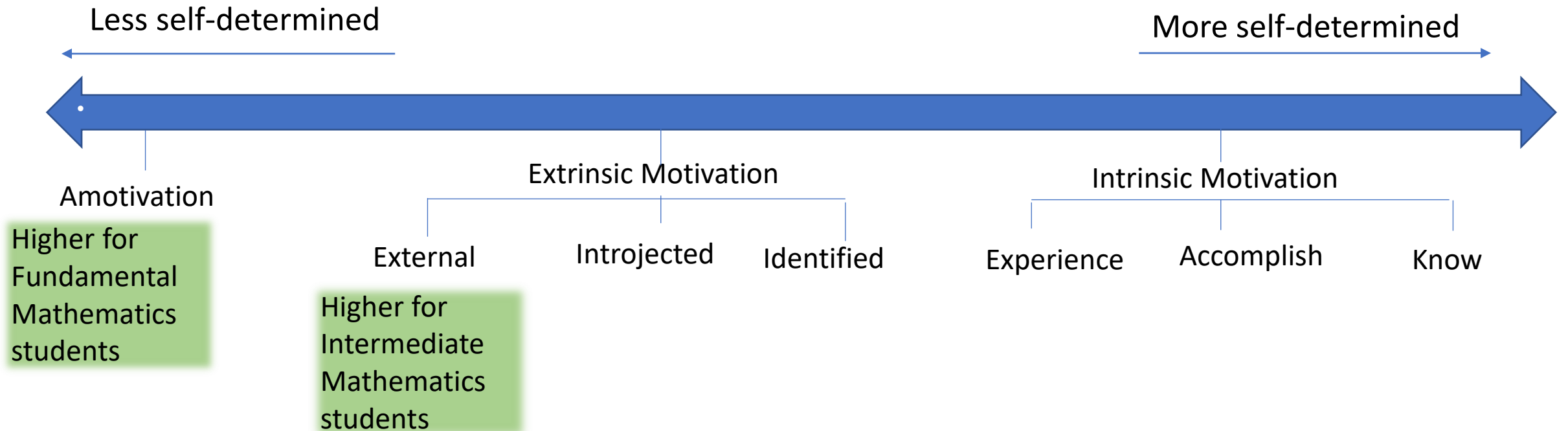
- Non-Irish nationals were significantly more likely to study advanced or intermediate mathematics ($\chi^2 = 3.58$, $df = 1$, $p = .059$).



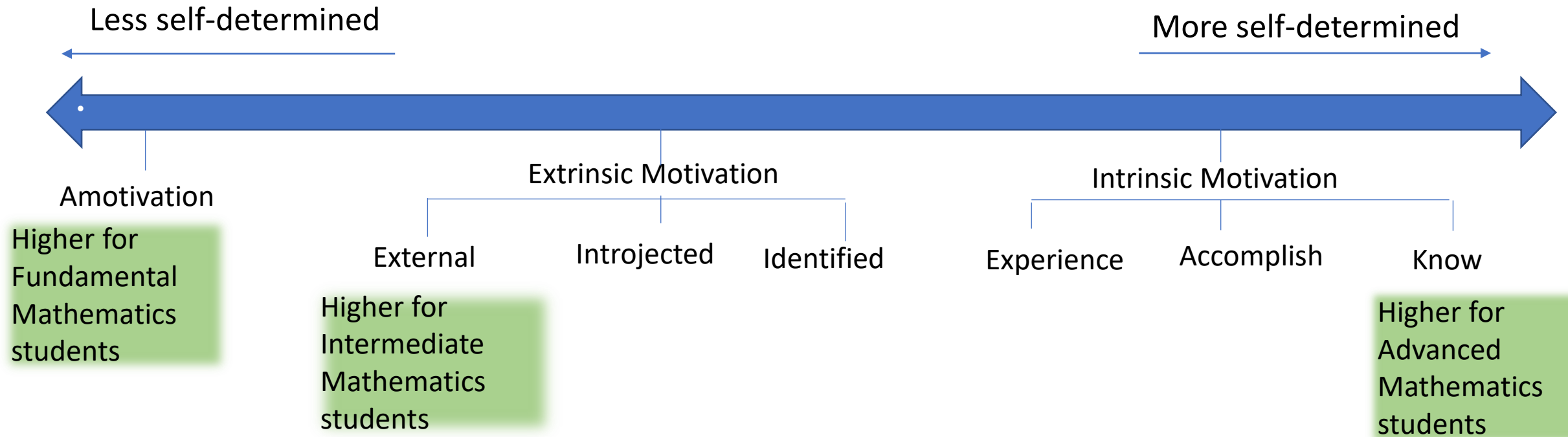
Results - Motivation



Results - Motivation

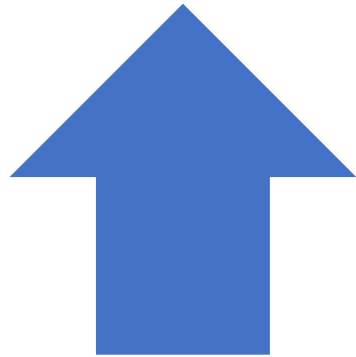


Results - Motivation

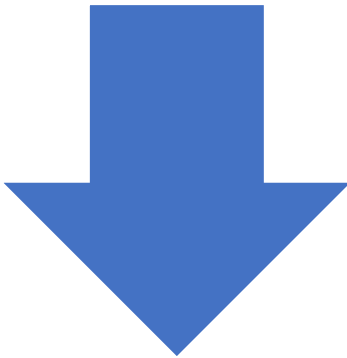


Results – Personality Traits

Neuroticism



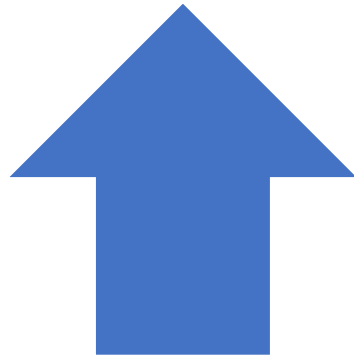
Fundamental
Mathematics
students



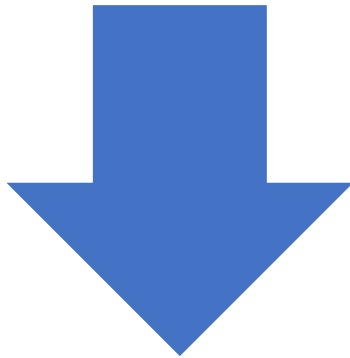
Advanced and
Intermediate
Mathematics
students

Results – Personality Traits

Neuroticism

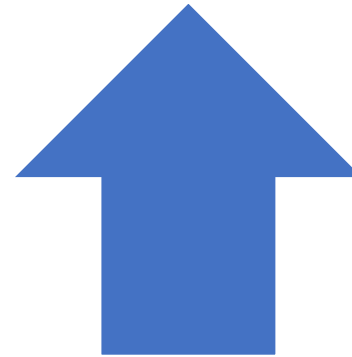


Fundamental
Mathematics
students

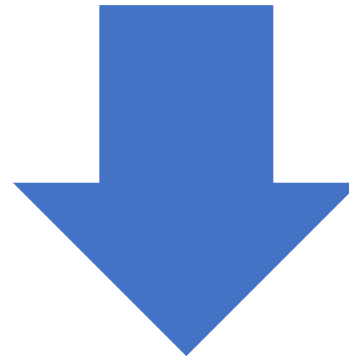


Advanced and
Intermediate
Mathematics
students

Extraversion



Young Adult students

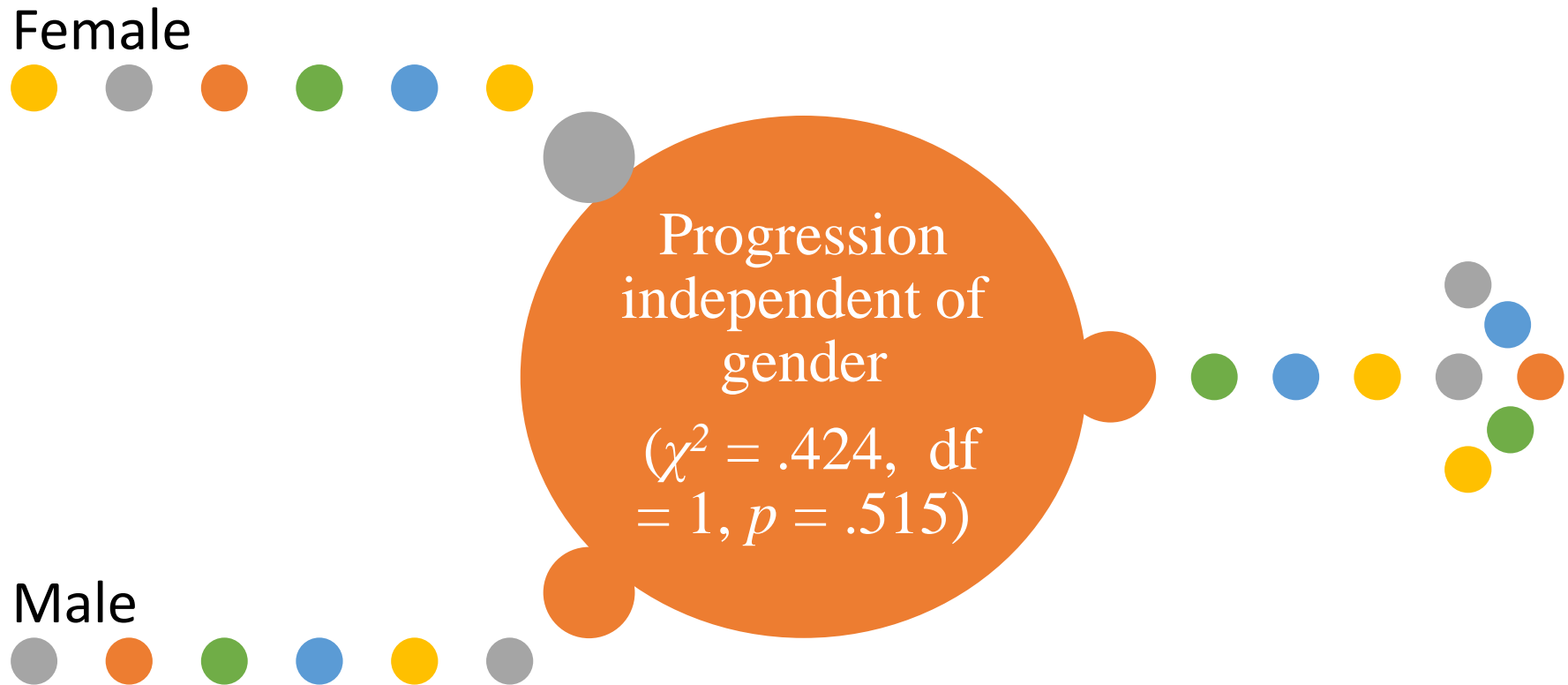


Mature students

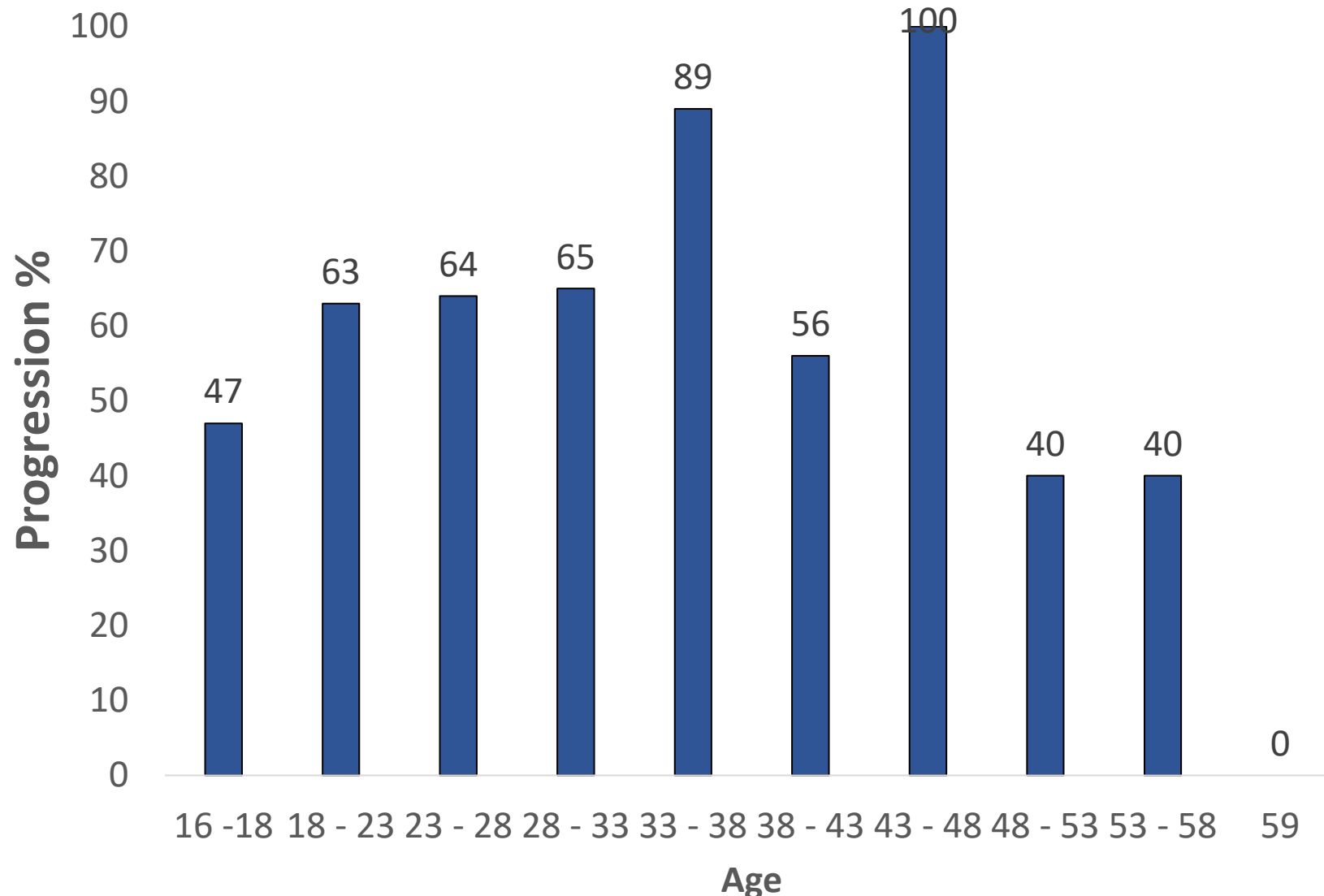
Results – General Self-efficacy and BMA

Students	GSE Score	BMA
Fundamental Mathematics Students	Significantly lower	Significantly lower
Intermediate Mathematics Students	Significantly higher	Significantly higher
Non-Irish Nationals	Significantly higher	Significantly higher

Results - Progression



Results - Progression

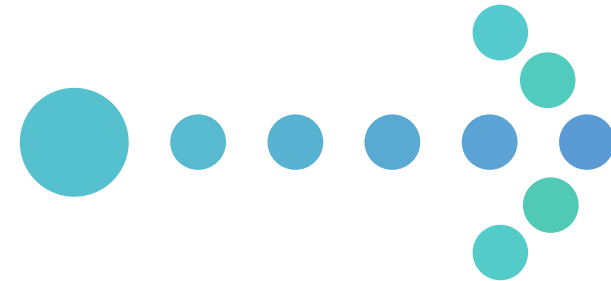
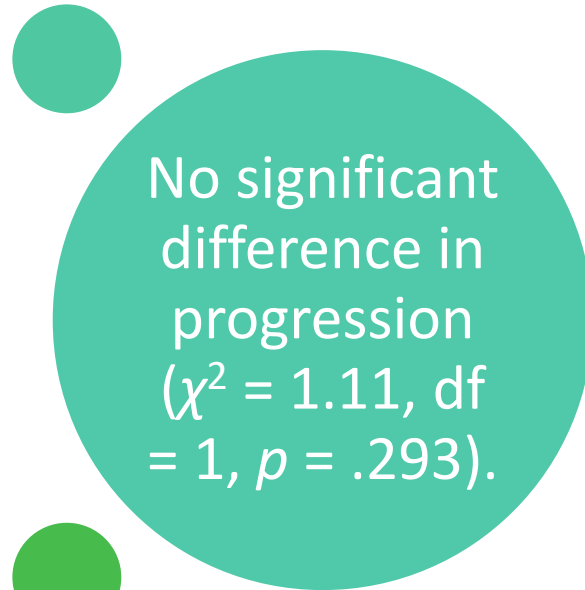


Results - Progression

Irish Nationals (61%)

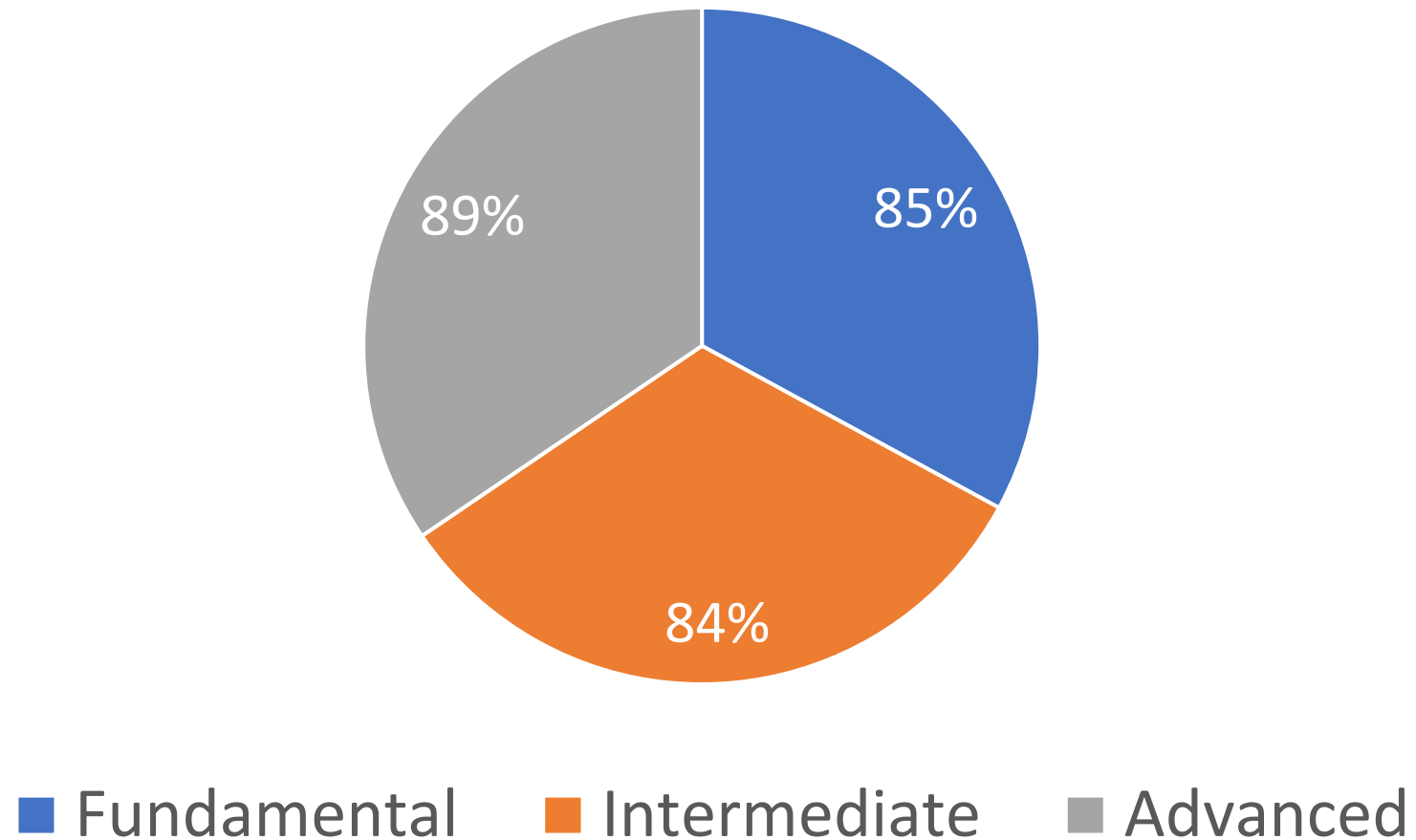


Non-Irish Nationals
(69%)



Results - Progression

Progression by Level of Mathematics Module



Results - Progression

- Mature students studying intermediate mathematics were more likely to progress than their young adult peers ($\chi^2 = 8.39$, $df = 1$, $p = .004$)
- Non-Irish nationals who studied advanced mathematics had lower progression rates than Irish nationals ($\chi^2 = 2.92$, $df = 1$, $p = .087$).

Results - Progression

- There was no statistically significant difference in progression based on
 - students' mean ranks for intrinsic motivation total, extrinsic motivation total or amotivation.
 - personality traits
 - GSE score
- Students who progressed had significantly higher mean ranks for BMA than those who did not progress

Discussion

Research question: Is there a relationship between psychosocial factors, Access students' mathematical experiences and their progression to undergraduate studies?

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The findings varied depending on demographics and a combination of factors

- Mature students who were studying intermediate mathematics, had higher BMA and had higher GSE were more likely to progress
- Non-Irish nationals with higher BMA and GSE scores who studied advanced mathematics were less likely to progress.

Recommendations

- Access students should be provided with opportunities to improve their self-efficacy and self-belief
- Non-Irish nationals may need extra supports in modules involving technical language
- Female Access students should be encouraged to study science technology, engineering and advanced mathematics courses.

Future Research

Research should examine

- why Access students choose the level of mathematics modules that they do
- Access students' previous mathematics performance
- Whether Access students' self-efficacy improved during the Access programme
- why non-Irish nationals studying advanced mathematics are less likely to progress than their Irish peers

$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$
 $f(x) = \lim_{h \rightarrow 0} \frac{(x+h)^2 - x^2}{h}$
 $= \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - x^2}{h}$
 $= 2x$

Secant Lines
 Tangent Line
 $x+h$

Thank You |