Unraveling How and Why Life Science Graduate Students Utilize Resources

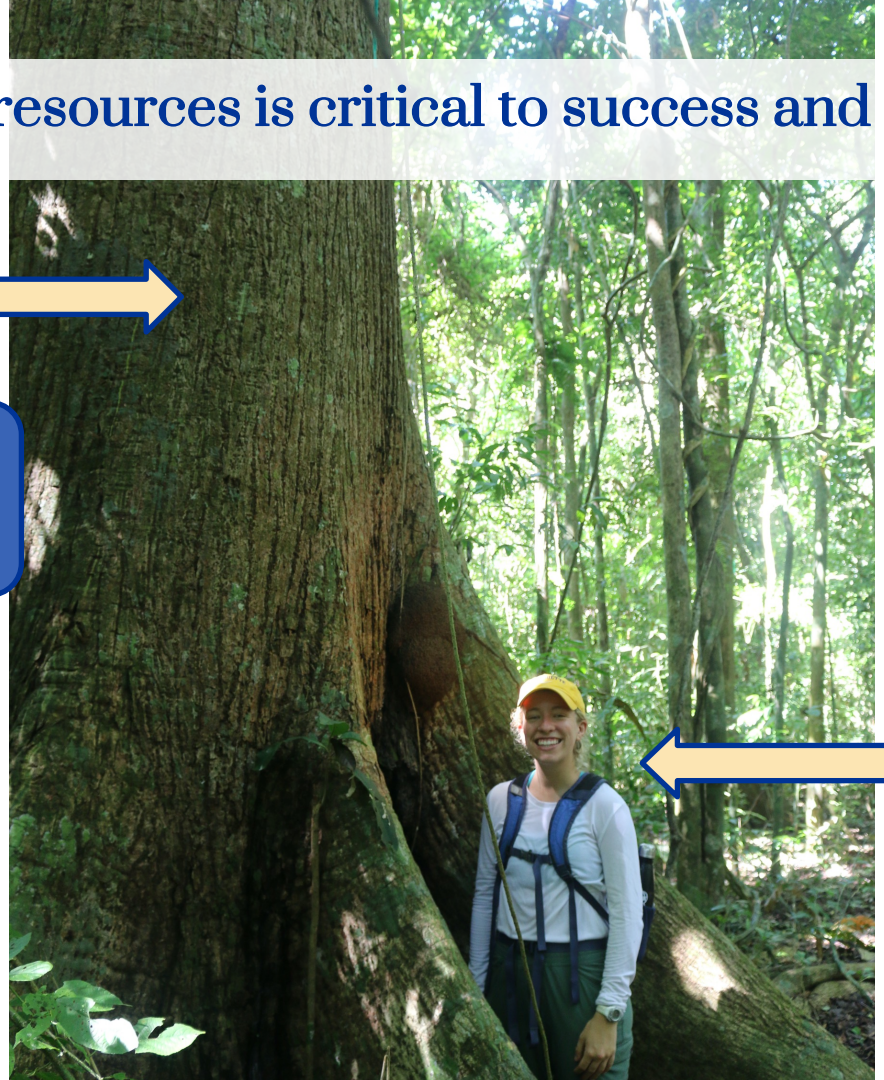
Maryrose Weatherton
Ph.D. Candidate – Schussler Lab
University of Tennessee - Knoxville

A resource is any person, place, or object that helps one accomplish a goal.

Ackerly, 2003; Dalling et al., 2012; Liu et al., 2021

Ackerly, 2003; Dalling et al., 2012; Liu et al., 2021

Access to resources is critical to success and persistence.



Lots of sun, water, and nutrients

Lots of advising and monetary support

Estrada et al., 2019; Sverdlik et al., 2018; Preuss et al., 2020

Resources are not distributed or used equally.

Estrada et al., 2019; Sverdlik et al., 2018; Preuss et al., 2020

Persistent inequities in higher education

6.4%

Life Science doctoral degrees awarded to Black students

8.2%

Life Science doctoral degrees awarded to Hispanic or Latino students

National Science Foundation, 2020

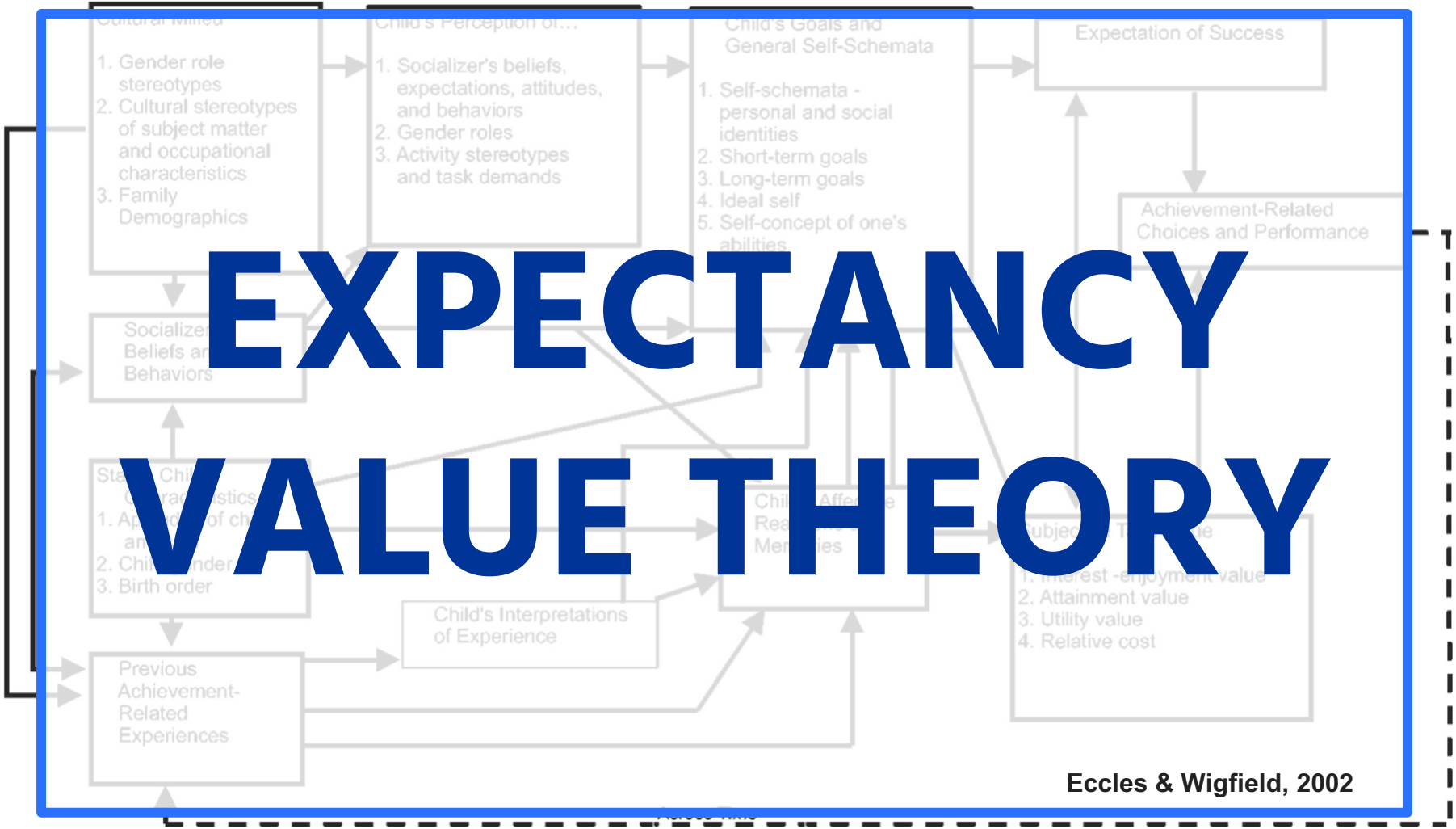
Resource use may be a critical tool to address inequities within higher education.

Research Objectives

RO 1: **Describe** life science graduate students' resource use (in terms of **number of resources** and **frequency of use**)

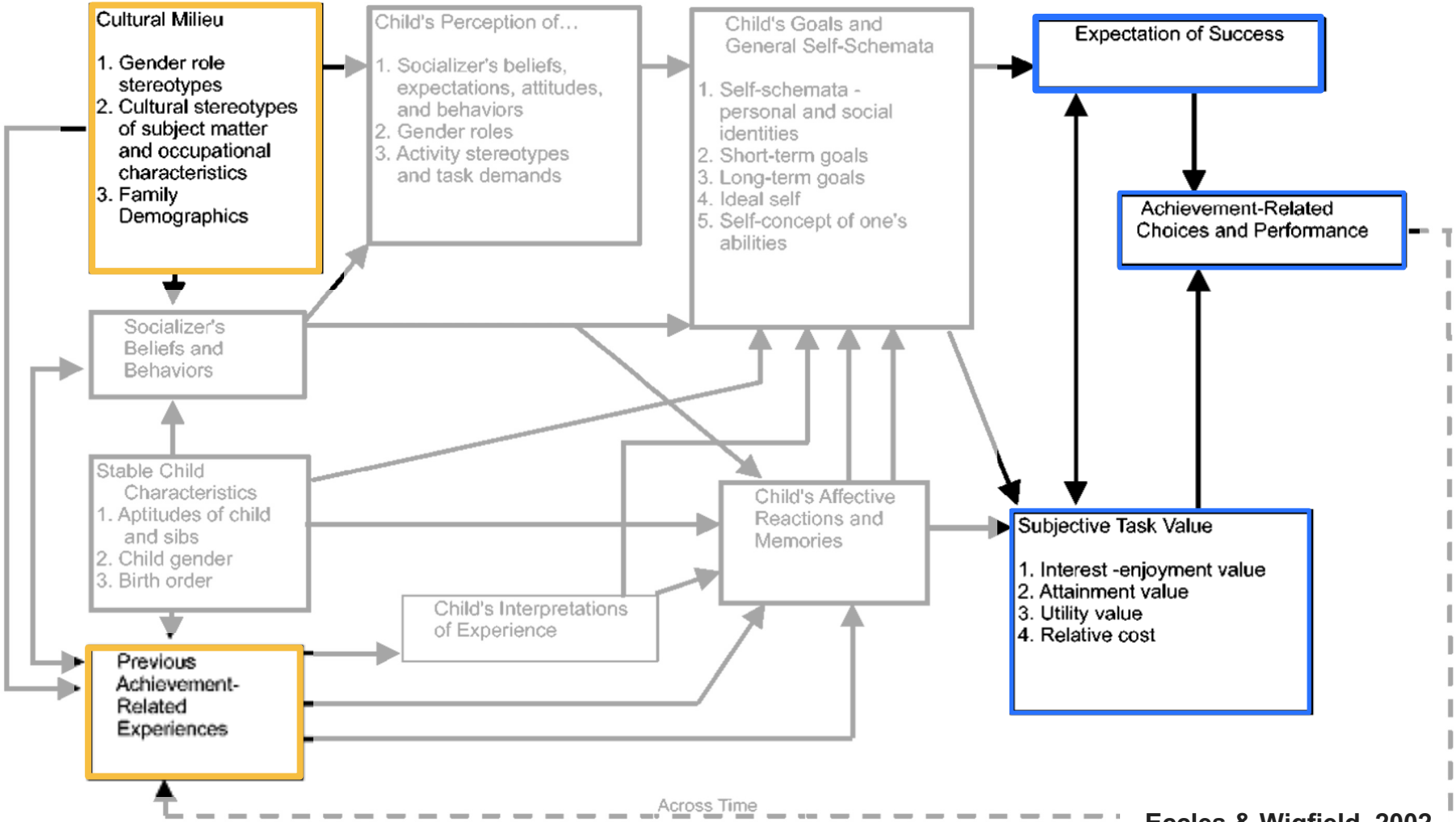
RO 2: **Explore why** life science graduate students choose certain resources over others

RO 3: **Examine** the relationship between resource use and student **demographic characteristics**



EXPECTANCY VALUE THEORY

Eccles & Wigfield, 2002

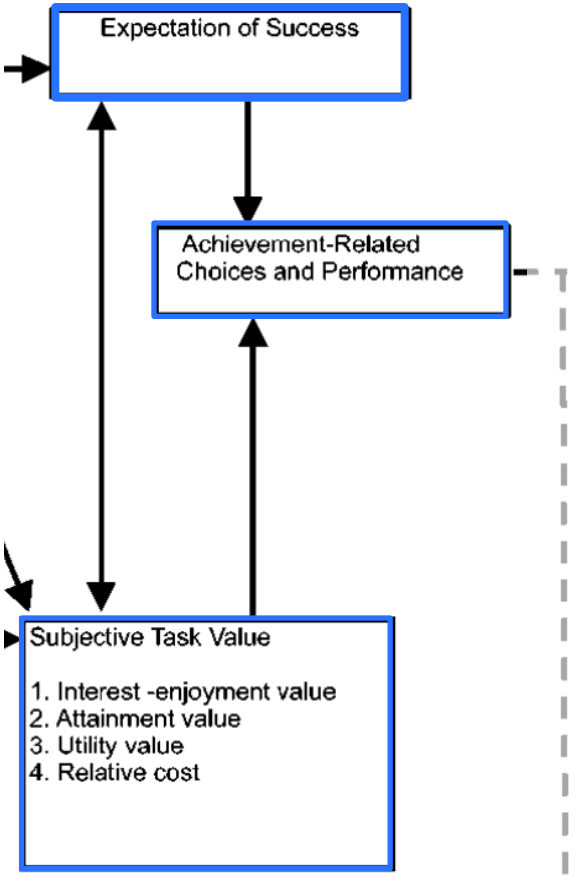


Eccles & Wigfield, 2002

Dependent Variables

Resource use outcomes:

- Number of resources
- Frequency of use
- Perception of resource value



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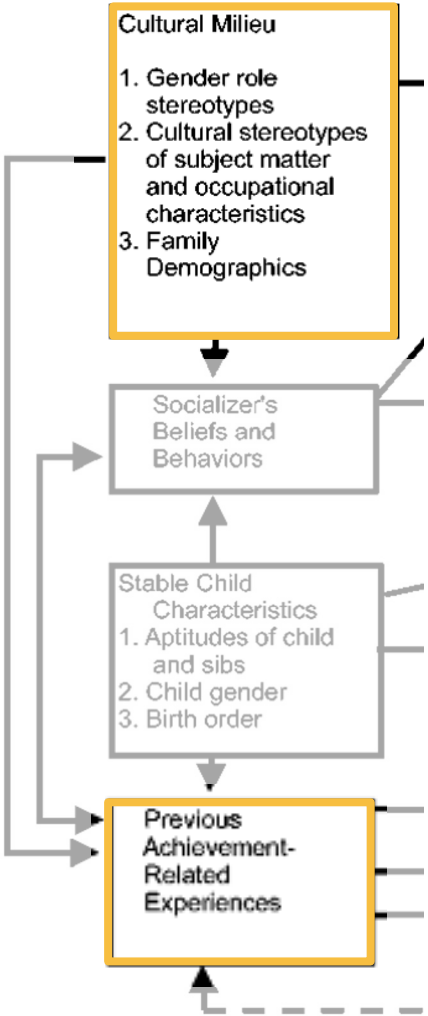

Demographic factors:

- Gender identity
- Racial identity
- Year in program
- College generation status

Eccles & Wigfield, 2002

Data collection

- National survey of life science (LS) graduate students
- Distributed in Fall 2021 via email listserv, social media, and departmental administrators
- Final sample size of **534** LS graduate students representing 81 institutions

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70.8% White
20.2% Nonwhite

70.2% Female
24.9% Male
4.8% Gender non-binary

22.1% 1st year
23.6% 2nd year
18.4% 3rd year
16.3% 4th year
19.65% 5th + year

52% First generation
46% Continuing generation

Resources surveyed

Academic support

- Online academic journals
- Electronic resources
- University courses
- University-provided research facilities
- Conferences

Institutionally provided

- University health center
- University gym
- University library
- University transit system
- University writing center
- University career center
- University sponsored workshops
- International student center
- University sponsored events

Monetary

- Academic stipend
- Grants
- Travel funds
- Publishing funds

Network

- Research collaborators
- Previous mentors
- Alumni network
- Department seminars
- Social media

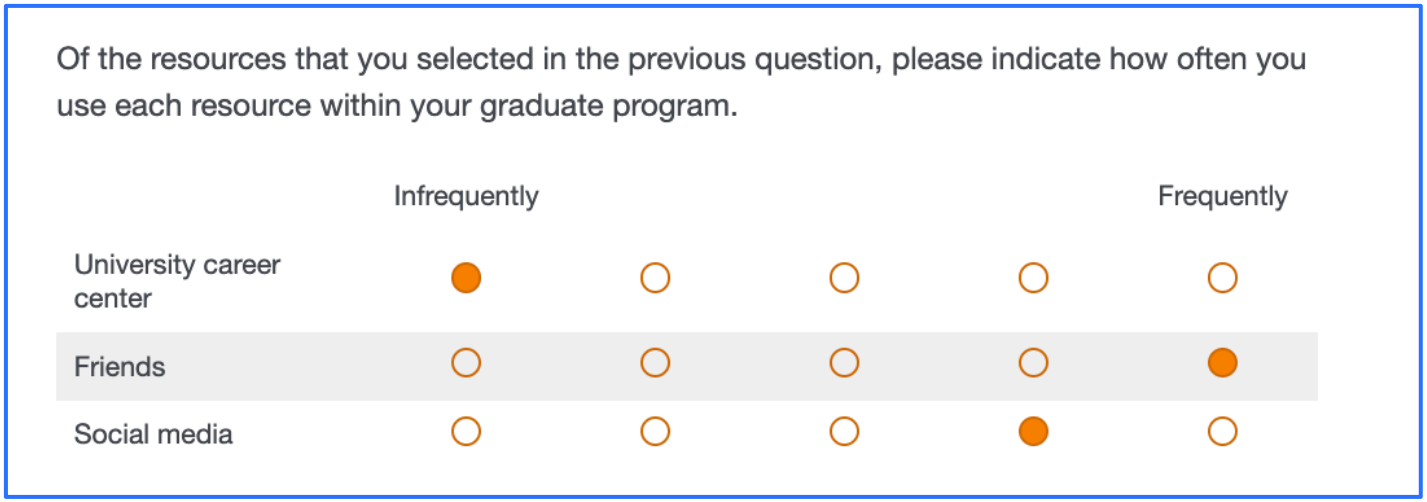
Social-academic

- Advisor
- Lab mates
- Other graduate students
- Department faculty
- Special interest student orgs.
- Department administrators
- Department graduate student assoc.

Social-nonacademic

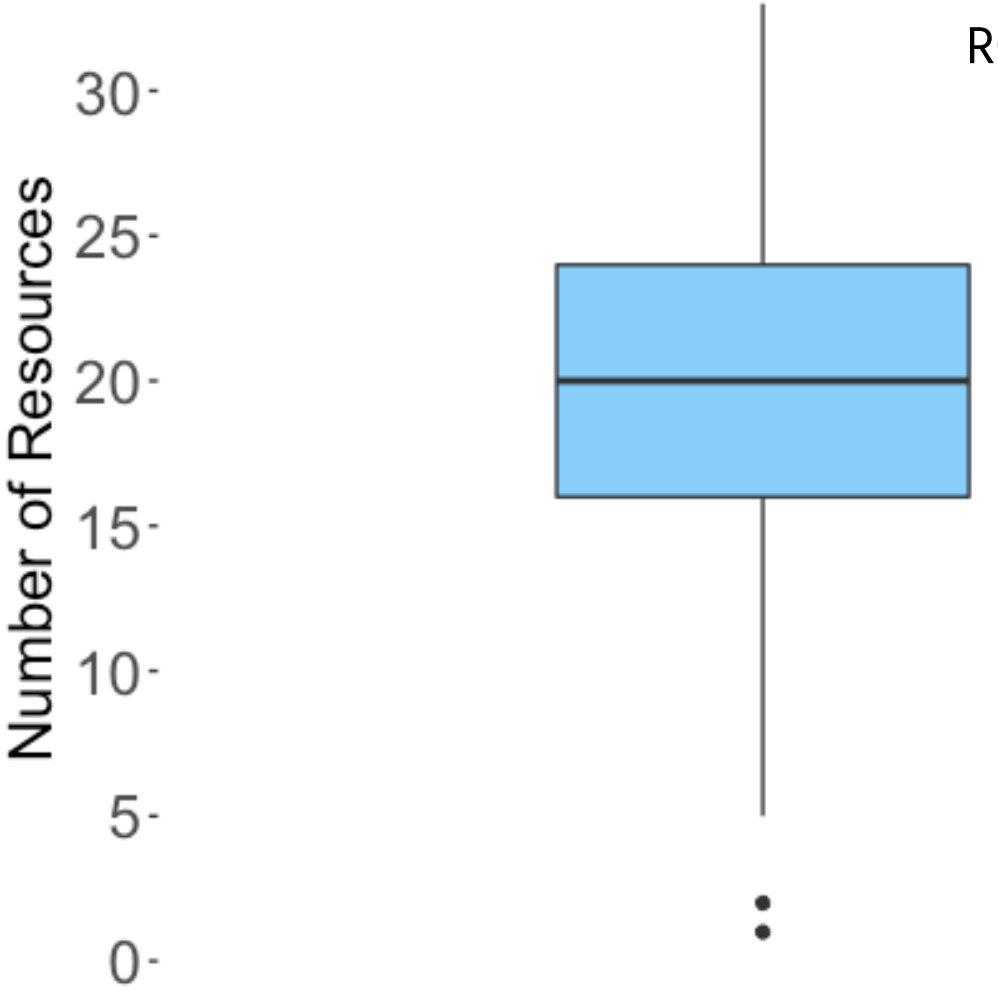
- Significant other
- Friends
- Family members
- Therapist

Data collection: frequency of use

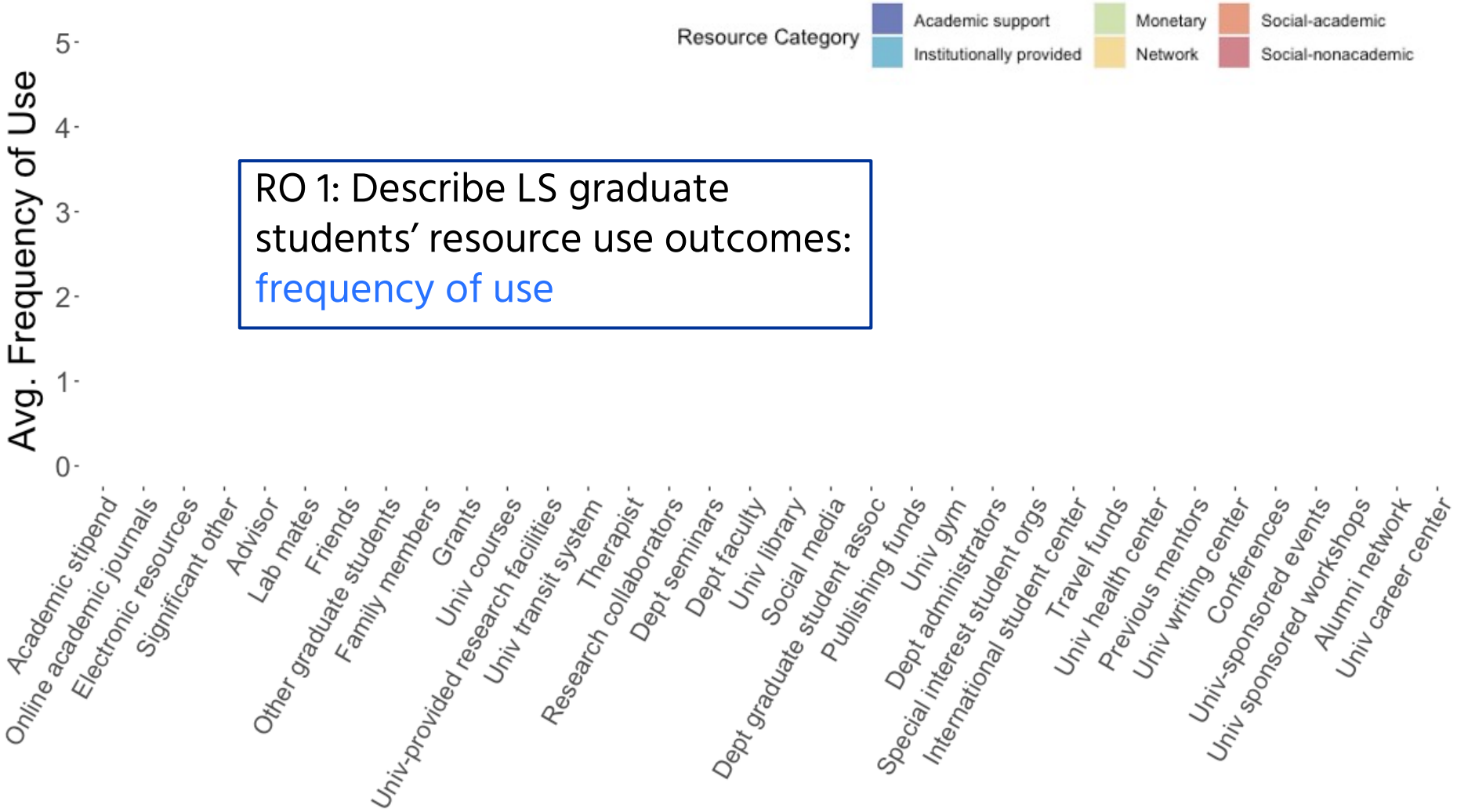


- Selections were assigned scores 1-5
- Ran descriptive statistics for each resources' **frequency of use**

RO 1: Describe LS graduate students' resource use outcomes: number of resources



19.4 ± 5.6



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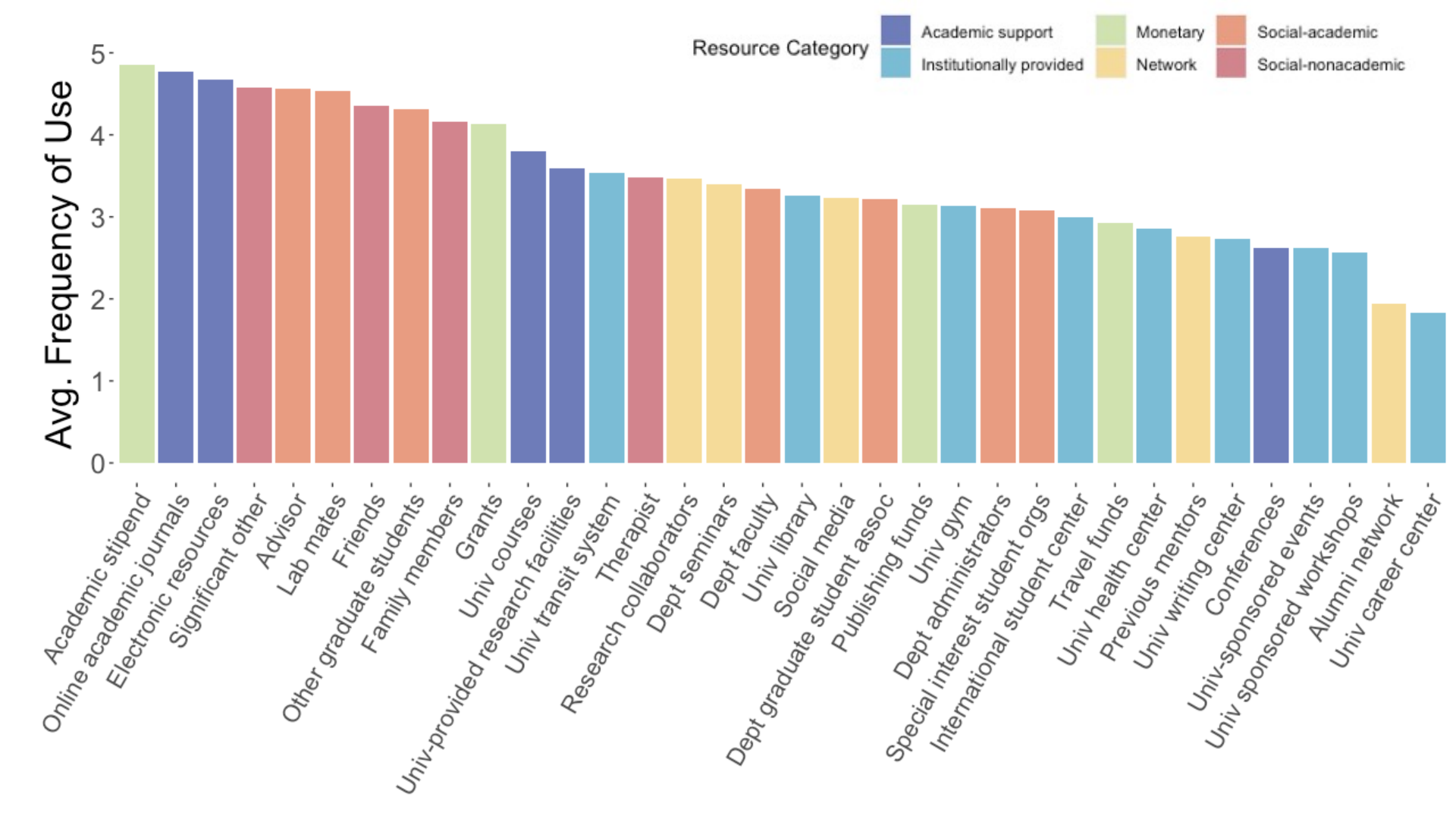
Resource Category
Academic support
Institutionally provided
Monetary
Network
Social-academic
Social-nonacademic
Avg. Frequency of Use
0
1
2
3
4
5
Academic stipend
Online academic journals
Electronic resources
Significant other
Advisor
Lab mates
Friends
Other graduate students
Family members
Grants
Univ courses
Univ-provided research facilities
Univ transit system
Therapist
Research collaborators
Dept seminars
Dept faculty
Univ library
Social media
Dept graduate student assoc
Publishing funds
Univ gym
Dept administrators
Special interest student orgs
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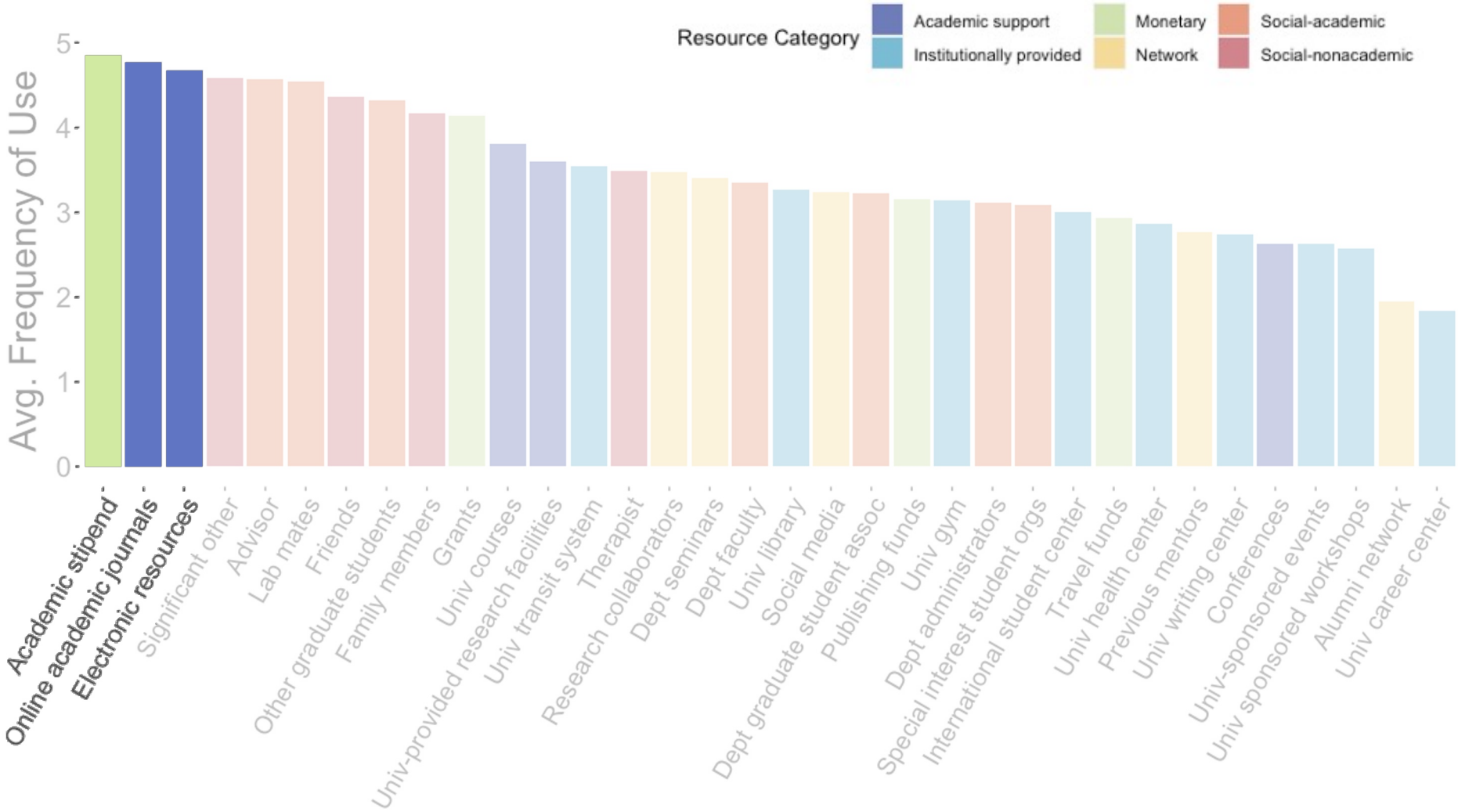
Travel funds
Univ health center
Previous mentors
Univ writing center
Conferences
Univ-sponsored events
Univ sponsored workshops
Alumni network
Univ career center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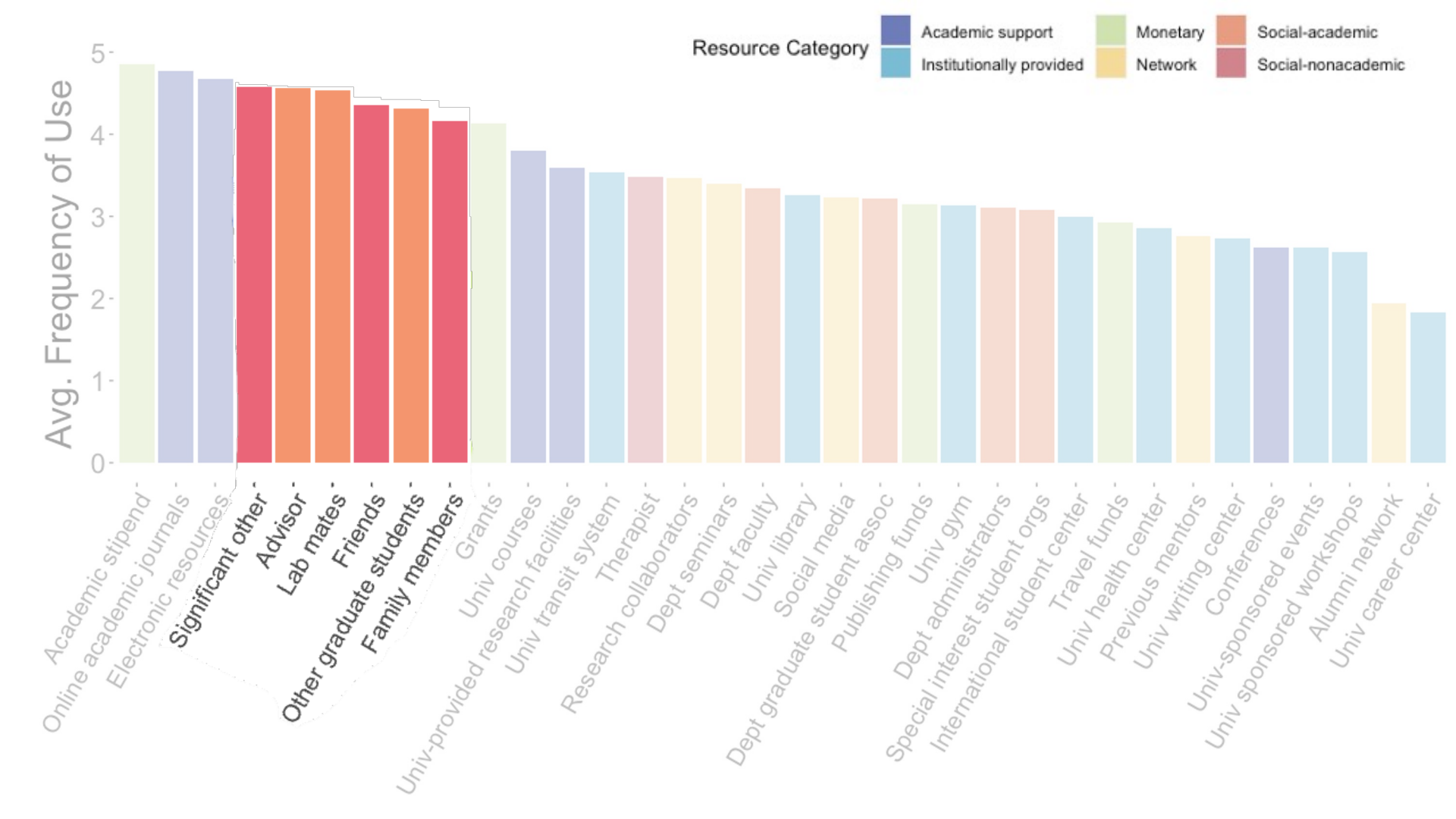
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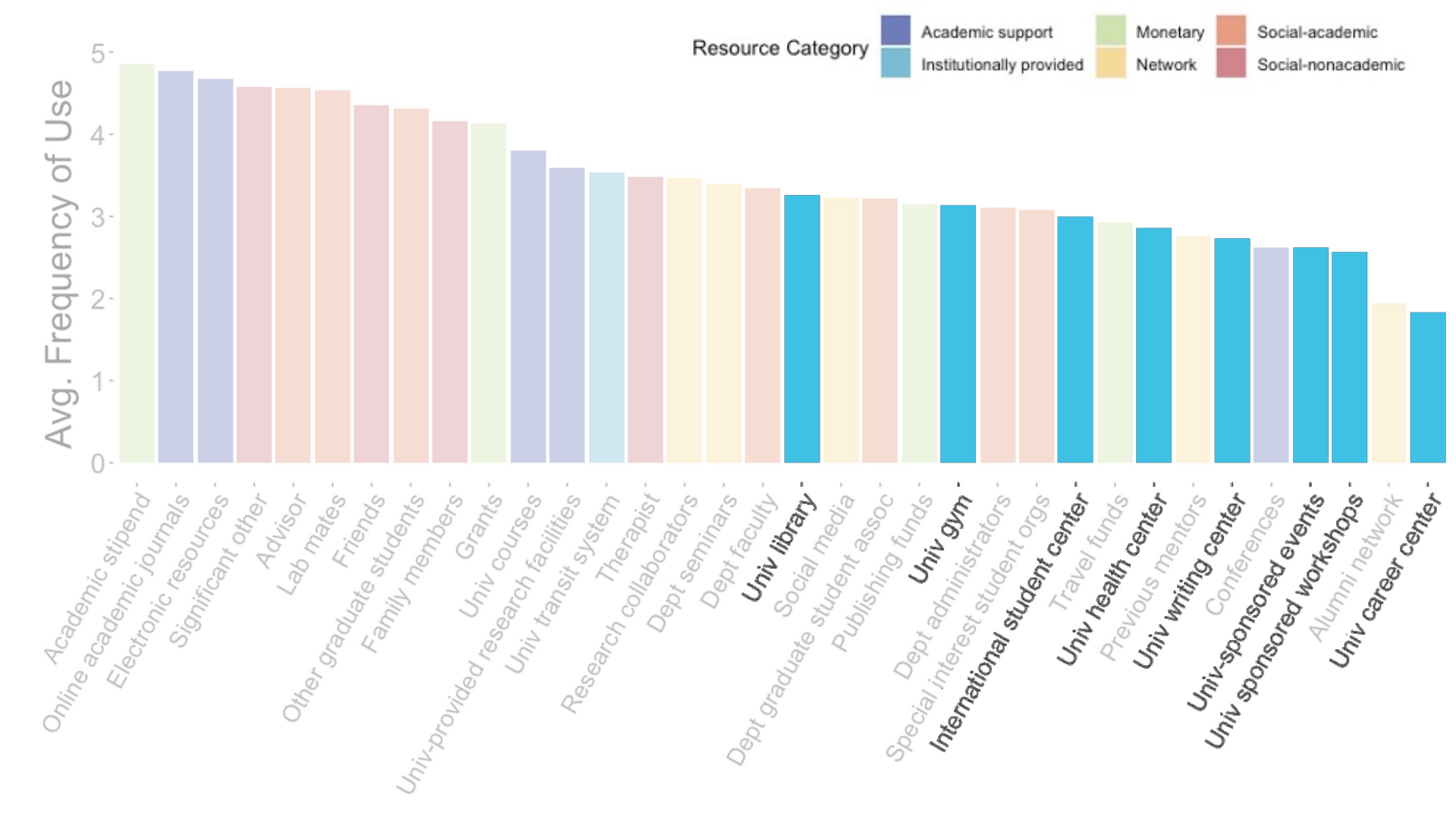
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Research objective 2

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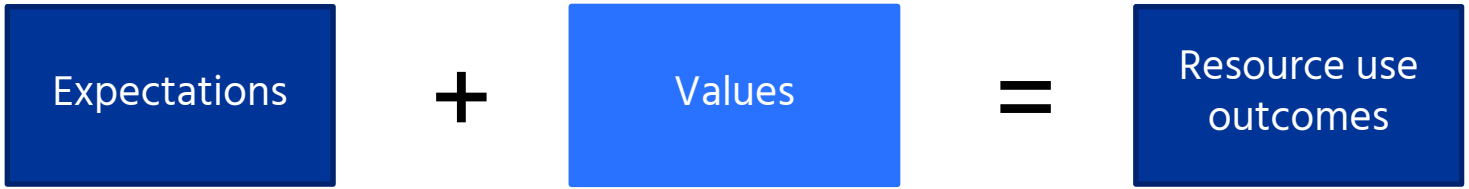
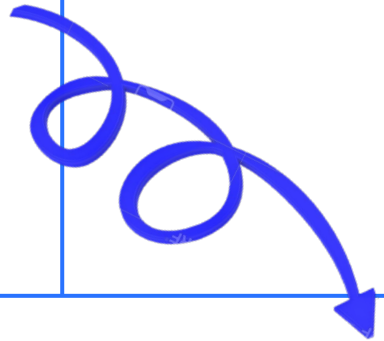


Data collection: perception of importance

Of the resources that you use, choose the 3 most important resources to you

- [x] University courses
- [ ] University health center
- [ ] International student center
- [x] Friends
- [ ] Significant other
- [x] Departmental seminars



Please describe why you feel that these resources are important

University courses	
Friends	
Departmental seminars	

Qualitative Methods

"Please describe why you feel these resources are important"

- Standard inductive coding methods
- Two coders
- Iteratively developed codebook with two themes and nine codes
- Final IRA > 70%

Patton, 2014; Gisev et al., 2013

RO 2: Explore how life science graduate students describe resource importance – Codebook

"Please describe why you feel these resources are important"

Resource attributes

Help provided

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance – Codebook

Resource attributes

- Availability
- Validity
- Essential

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance – Codebook

Resource attributes

- Availability
- Validity
- Essential

[Academic Stipend] “Without the stipend I would not be in school, without it a PhD was not affordable in my case.”

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance – Codebook

Resource attributes

- Availability
- Validity
- Essential

Help provided

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance – Codebook

Resource attributes

- Availability
- Validity
- Essential

Help provided

- Basic need
- Connection
- Academic
- Persistence
- Support
- Well-being

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance – Codebook

[Advisor] "…With a good advisor, it won't matter what the institution provides, they'll help you find the resources you need, they'll make sure you're on track, and they'll support you through it all."

Help provided

- Basic need
- Connection
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Weatherton et al., *in review*

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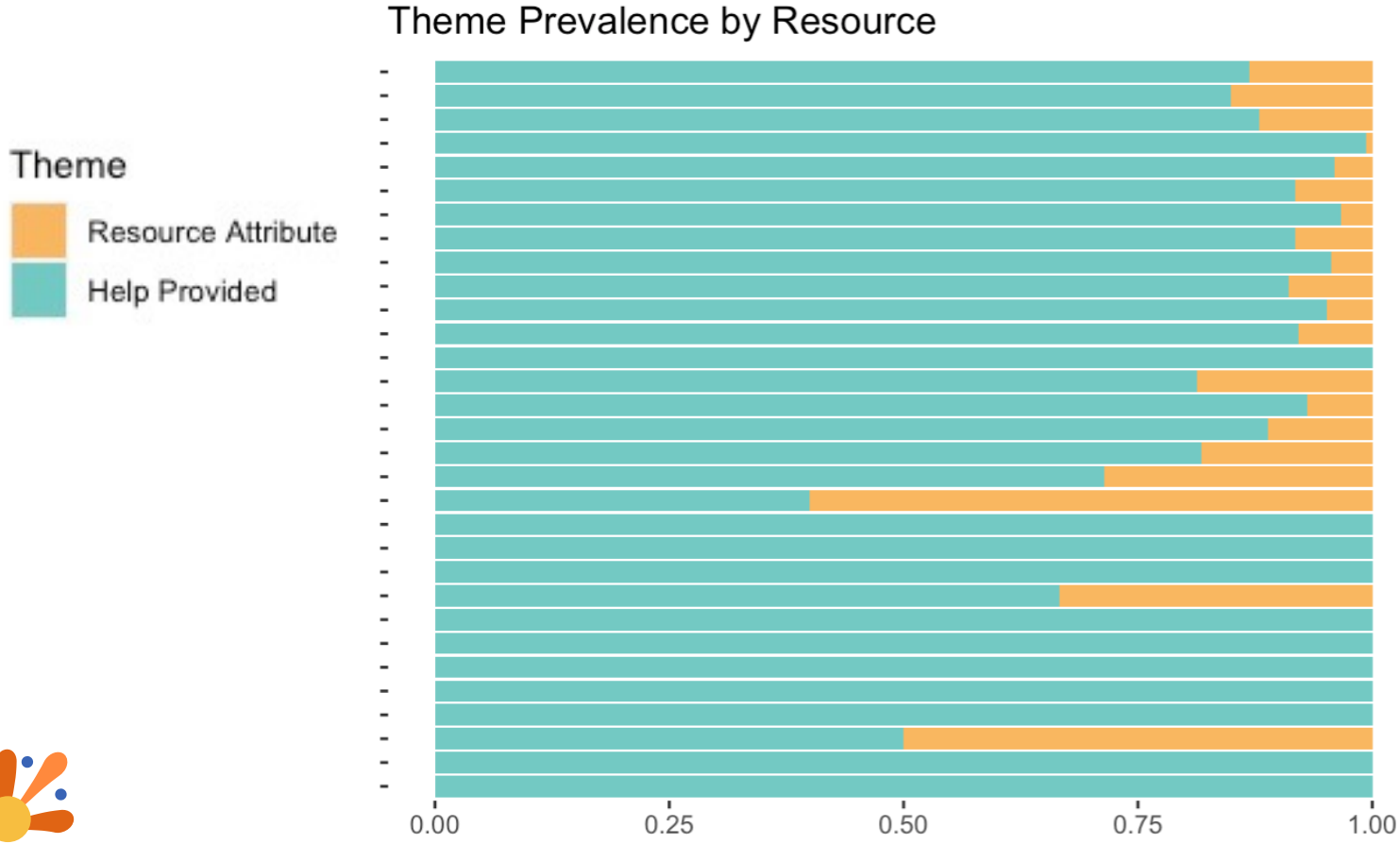

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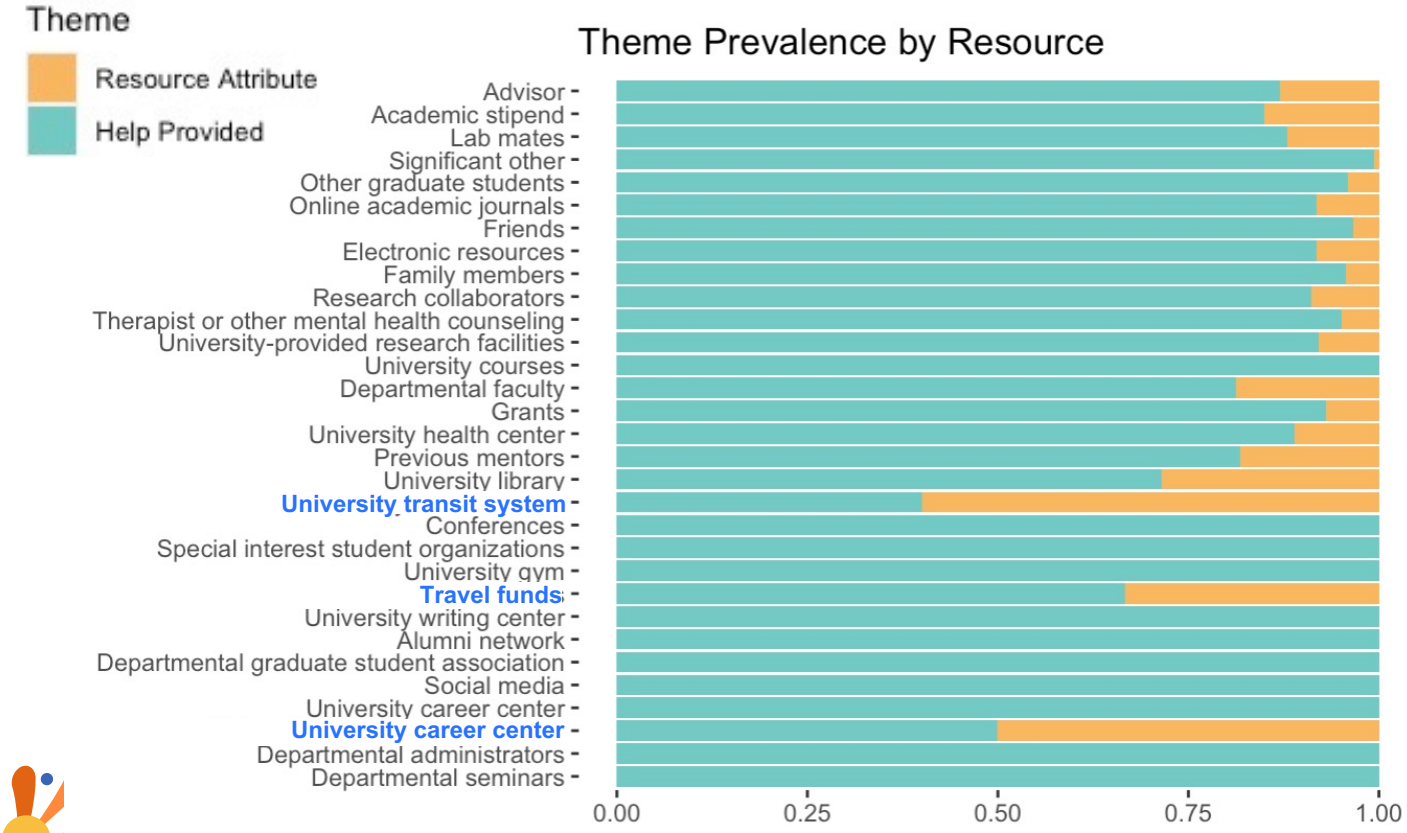

Most students describe resource importance in terms of the help that the resource provides.

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance

Code	N	Prevalence of 'Help provided'
Academic		
Support		
Well-being		
Basic need		
Persistence		
Connection		

PREDICT: Which codes were the most prevalent in our dataset?

Weatherton et al., *in review*

RO 2: Explore how life science graduate students describe resource importance

Code	N	Prevalence of 'Help provided'
Academic	585	32.21%
Support	459	25.28%
Well-being	267	14.70%
Basic need	236	13.00%
Persistence	78	4.30%
Connection	77	4.24%

Weatherton et al., *in review*

What resources are students using, and why?

RO 1: Students use many resources, and those that support students' basic needs are used most frequently.

What resources are students using, and why?

RO 1: Students use many resources, and those that support students' basic needs are used most frequently.

RO 2: Students value resources based on the help provided by those resources, predominantly academic and support help.

Research objective 3

Examine the relationship between student demographic characteristics and resource use outcomes.

RO 3: Examine the relationship between student demographics and number of resources used

- Ran a generalized linear model with Poisson link function to predict the **number** of resources used

- Predictor variables included:
  - Gender identity (man or woman)
  - Racial identity (white or nonwhite)
  - Year in program (1, 2, 3, 4, 5, 6+)
  - College generation status (first generation or continuing generation)

Weatherton & Schussler, 2022

RO 3: Examine the relationship between student demographics and number of resources used

- Women reported using significantly more ($P < 0.001$) resources than men
- Nonwhite students reported using significantly more ($P < 0.02$) resources than white students
- Year was significantly related ($P < 0.005$) to number of resources used
- There was no significant difference in the number of resources used by first-generation and continuing-generation students

Weatherton & Schussler, 2022

RO 3: Examine the relationship between student demographics and frequency of use

- Ran separate ANOVA models and Tukey post-hoc analyses for all resources' frequency of use

- Predictor variables included:
  - Gender identity (man or woman)
  - Racial identity (white or nonwhite)
  - Year in program (1, 2, 3, 4, 5, 6+)
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Weatherton & Schussler, 2022

RO 3: Examine the relationship between student demographics and frequency of use

Gender identity – 5 resources
Racial identity – 21 resources
Year in program – 6 resources
College generation status – 1 resource

Weatherton & Schussler, 2022

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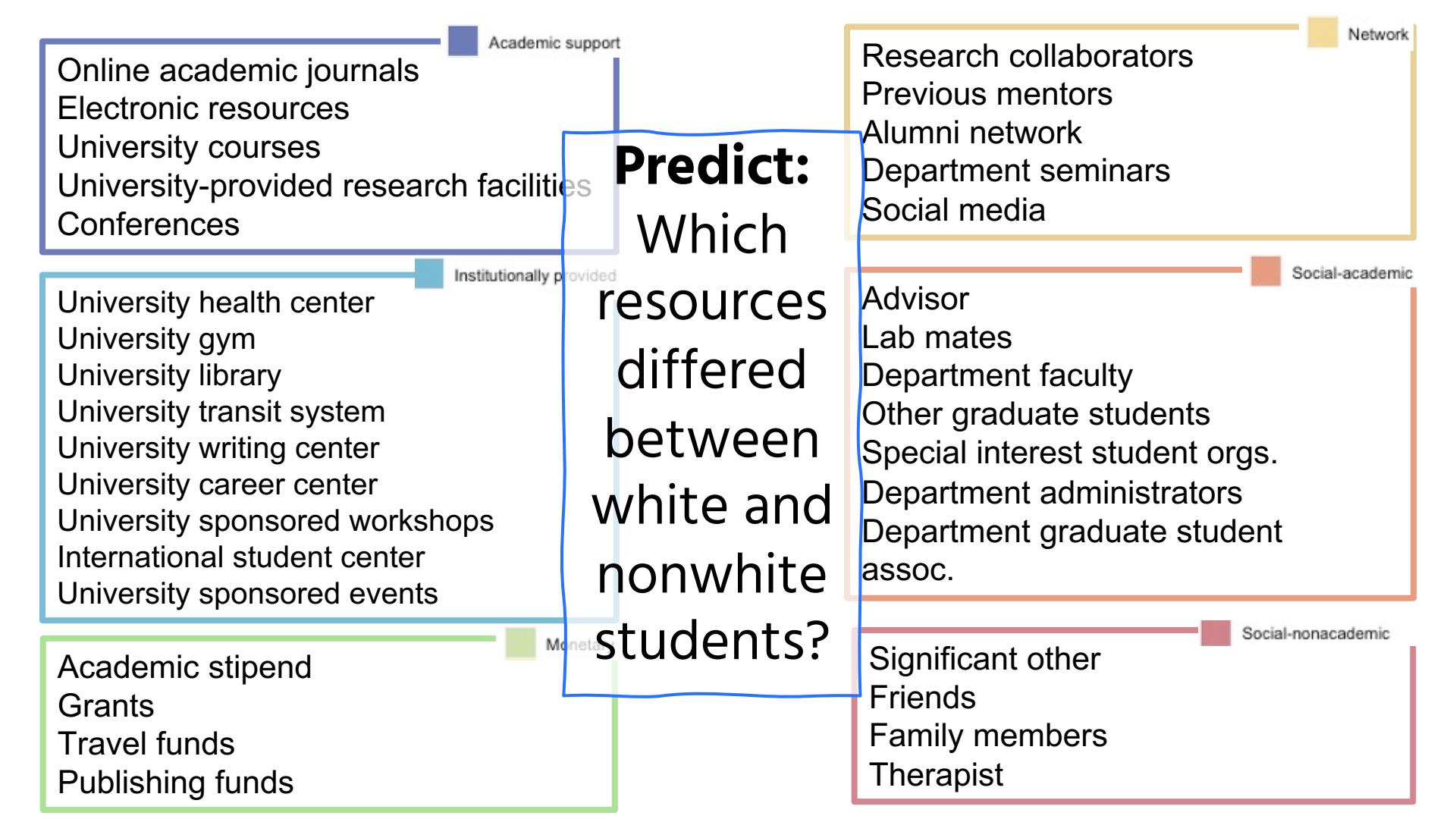
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University gym
University library
University transit system
University writing center
University career center
University sponsored workshops
International student center
University sponsored events
Monetary
Academic stipend
Grants
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Publishing funds
Predict:
Which resources differed between white and nonwhite students?
Network
Research collaborators
Previous mentors
Alumni network
Department seminars
Social media
Social-academic
Advisor
Lab mates
Department faculty
Other graduate students
Special interest student orgs.
Department administrators
Department graduate student assoc.
Social-nonacademic
Significant other
Friends
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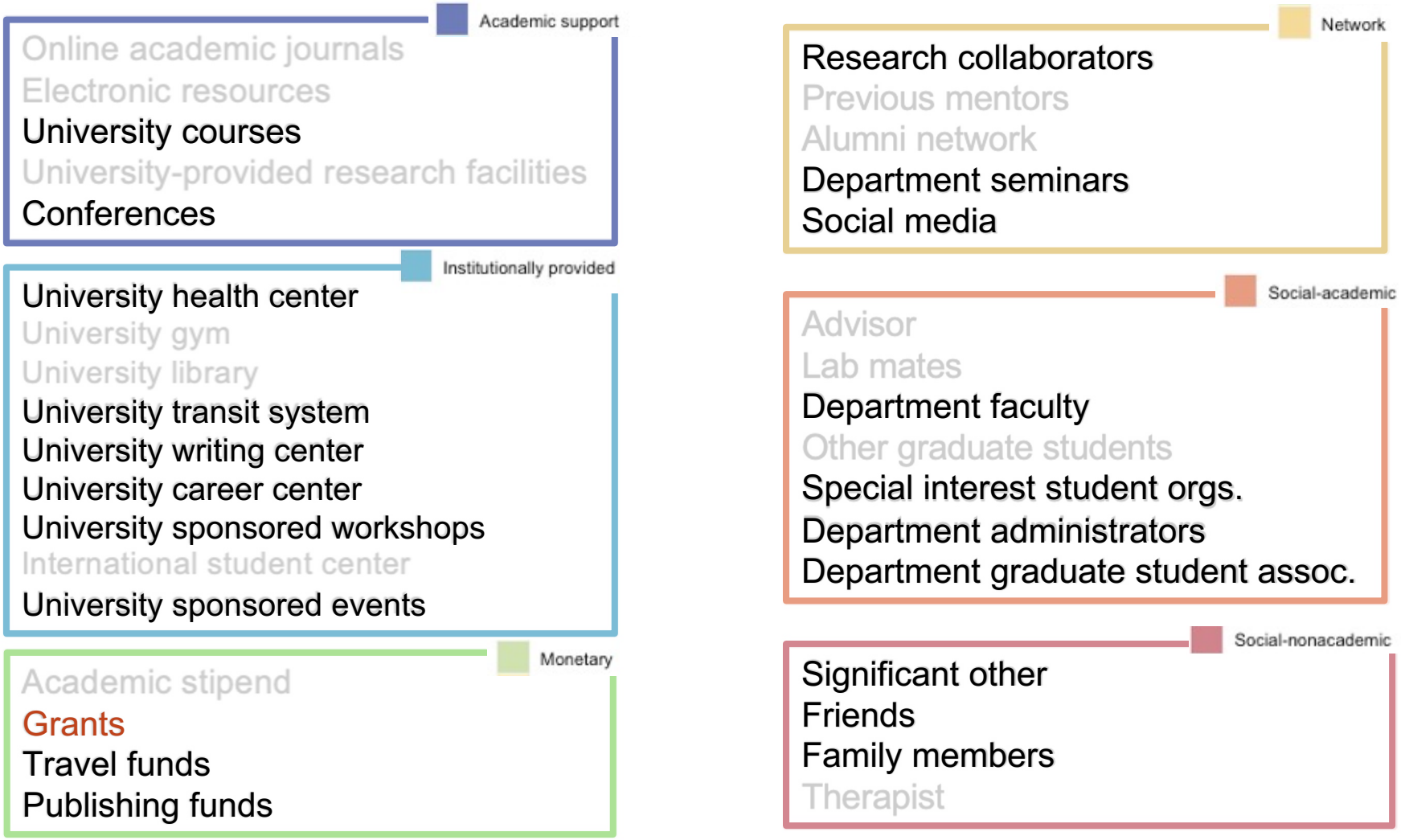
Therapist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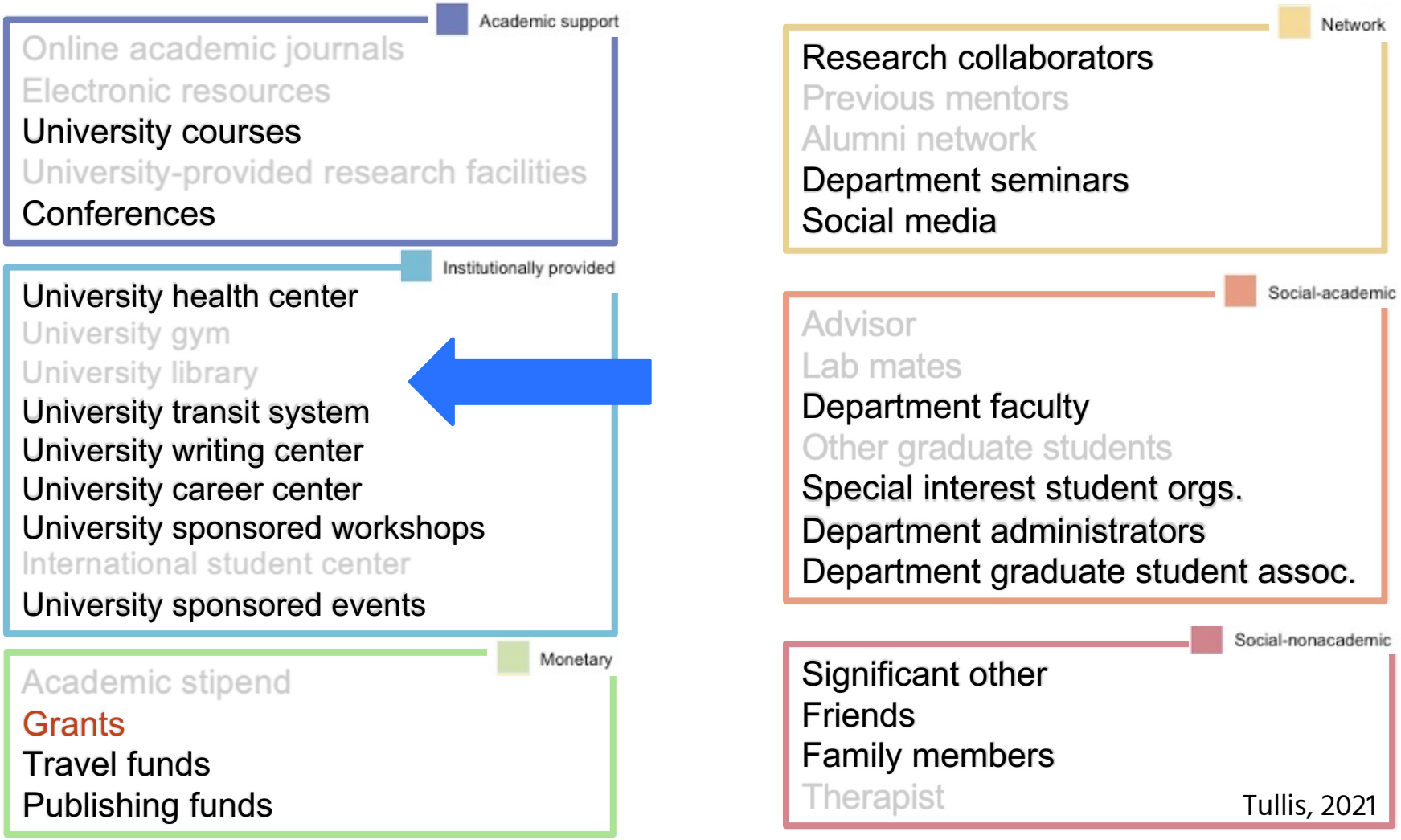
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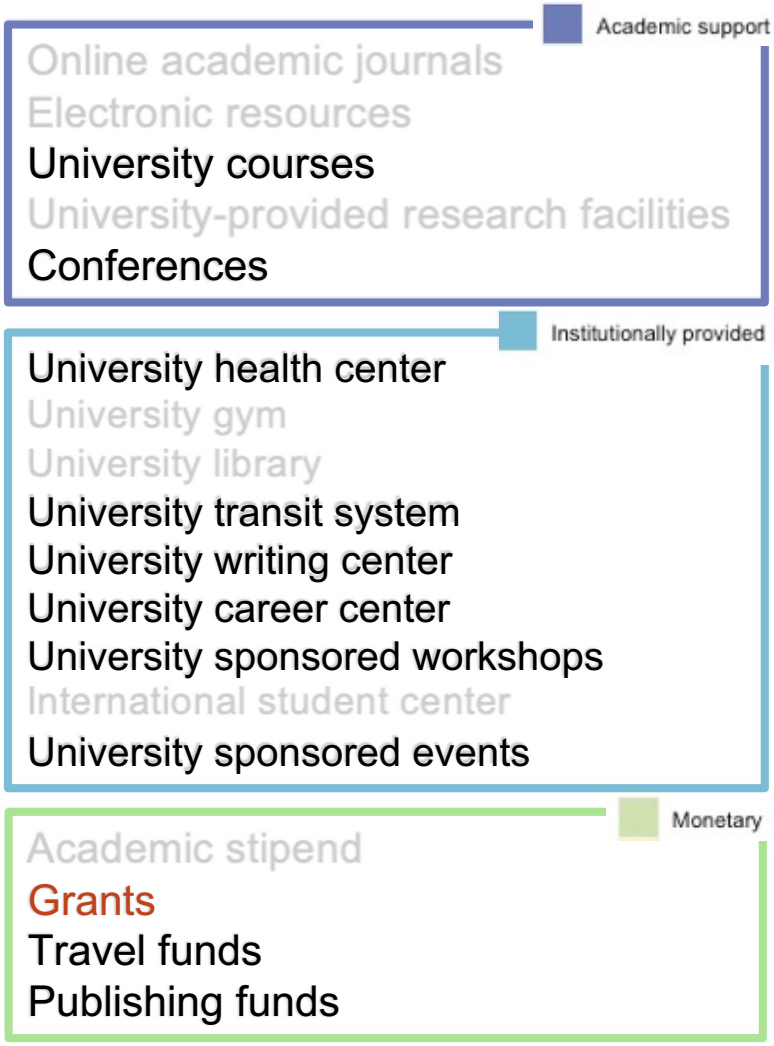
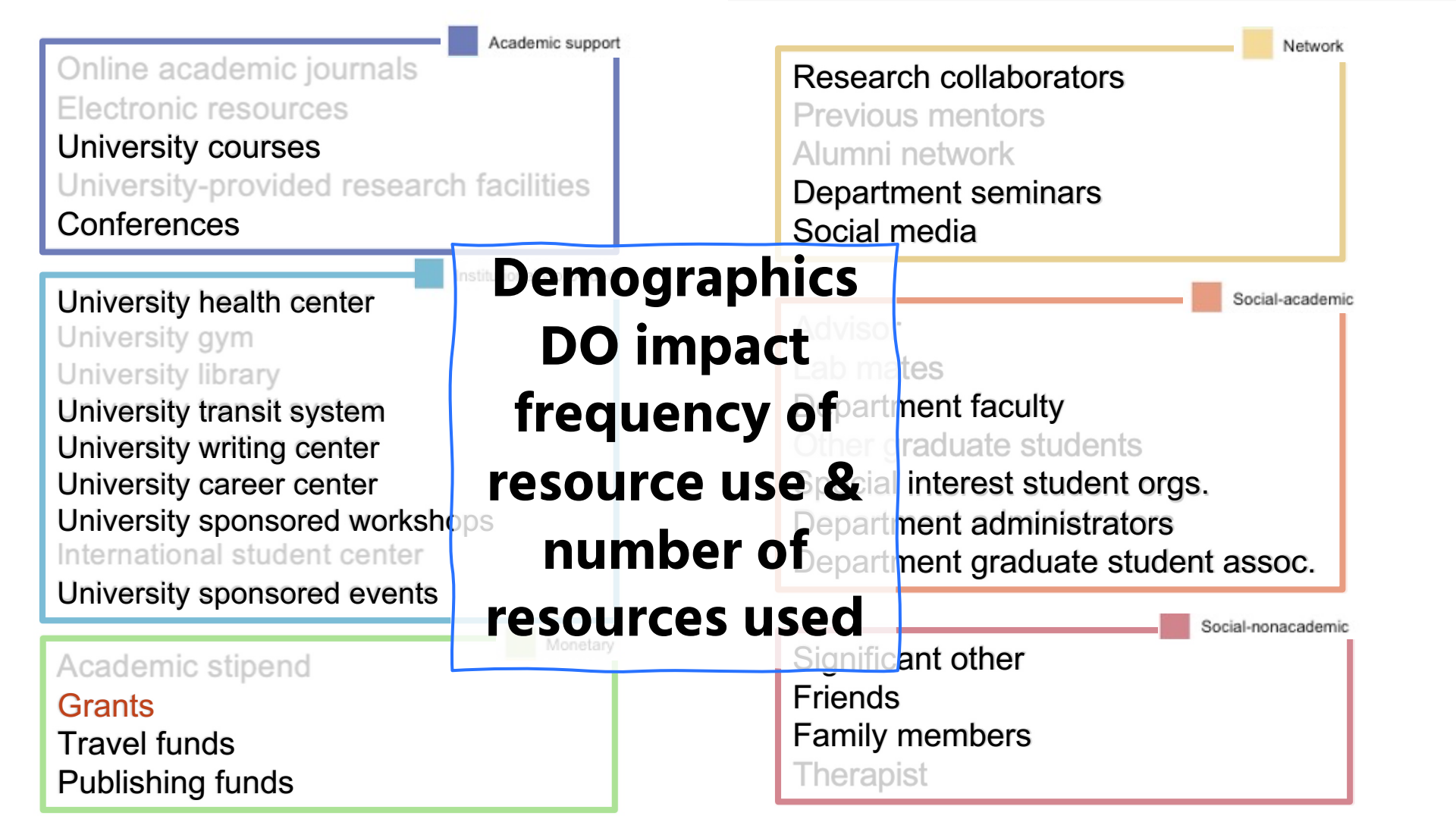
Tullis, 2021



Tullis, 2021; Yosso, 2005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Demographics DO impact frequency of resource use & number of resources used
Academic stipend
Grants
Travel funds
Publishing funds
Social-nonacademic
Significant other
Friends
Family members
Therapist

RO 3: Examine the relationship between student demographics and perception of value

Resource: Advisor

Code	Δ First / Continuing generation	Δ Nonwhite / White	Δ Woman/Man	Δ Years 1-2 / Years 3+
Academic				
Connection				
Support				
Persistence				
Well-being				

Weatherton et al., *in review*

RO 3: Examine the relationship between student demographics and perception of value

Resource: Advisor

Code	Δ First / Continuing generation	Δ Nonwhite / White	Δ Woman/Man	Δ Years 1-2 / Years 3+
Academic	+2.27%	+4.48%	+0.33%	+3.24
Connection	+0.77%	-1.53%	+1.1%	-3.44%
Support	-4.58%	-4.96%	-7.71%	-0.44%
Persistence	+0.94%	+1.89%	+4.18%	-0.75%
Well-being	+1.34%	+1.31%	+1.56%	+3.59%

No **significant** demographic differences

Weatherton et al., *in review*

Varied influence of demographic characteristics

RO 3:

Demographic characteristics are significantly related to number of resources used & frequency of use, they're **not** significantly related to student perception of value.

What's with the varied influence of demographic characteristics??

- Filtering?
- Universal needs?
- Sample size too small?
- Something else…?!

Implications

Academic and non-academic social supports are critical to students

Universities and departments must address students' basic needs

Williams, 2000; Woolston, 2022

Implications

Students may use different resources, but they're using them for the same reasons

In order to support the widest possible diversity of students, we should provide the largest possible selection of resources

Williams, 2000; Woolston, 2022

Future Work

Examine relationships between resource use and academic success

More work to understand varied influence of demographic factors

Acknowledgements

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Dr. Joshua Rosenberg

National PhD salary info:
https://rhettrautsaw.app/shiny/BiologyPhDStipends/

NSF Graduate Research Fellowship Program

EEB

University of Toronto OISE | Ontario Institute for Studies in Education

Centre for the Study of CIHE Canadian & International Higher Education

Thank you!

Questions?

Maryrose Weatherton
mweath13@vols.utk.edu

@schusslerlab
@weathertonsci