GSG
GLOBAL STRATEGY GROUP

Messages Matter
Full Research Findings
February 2023

DISCOVER ENGINEERING

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NORTHROP GRUMMAN FOUNDATION

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NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Our Purpose

- In the early 2000s two projects, *Changing the Conversation* (CTC) and *Engineer Your Life* (EYL), looked at how the engineering community was portraying itself, how the public and college-bound girls perceived engineering, and how it aligned with their professional priorities.

- This work resulted in an “a-ha moment” where it became clear that how we were talking about ourselves (engineers solve problems using math and science) neither illustrated the critical work being done by engineers nor aligned with career or personal aspirations for students, their parents, or teachers.

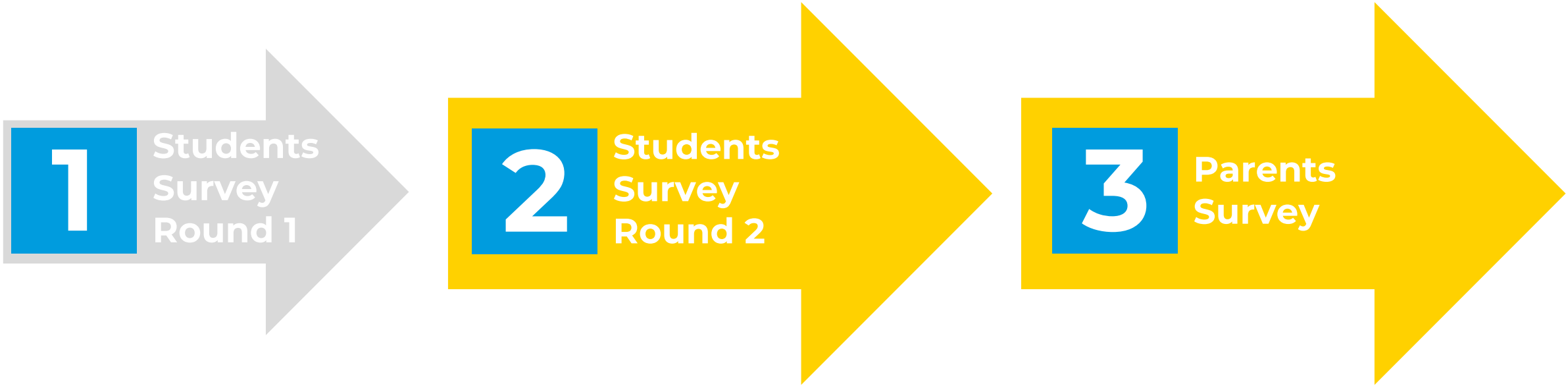
- This research led to a wholesale change in the way the engineering community presented itself with newly tested messages and tag lines that emphasized the creativity of the field, the teamwork aspect, and how engineering shapes our world.

- Fast forward to 2022. Today’s teens are being shaped by different world events as well as being the first generation to grow up while being constantly online and plugged in. With this as the backdrop, we are curious to learn how the messages and themes identified in the EYL and CTC initiatives are holding up. Are they still relevant and meaningful? What is important to today’s students? How do today’s teens view engineering and a potential career in STEM? What resonates and motivates them to consider engineering?

Research Goals

- Gauge students' and parents' level of understanding and interest in engineering
- Assess general career motivators and values
- Evaluate current messages
- Explore new messaging and opportunities
- Identify differing attitudes and messaging opportunities by race, gender, and self-identified disabilities.

Methodology



Global Strategy Group conducted an online survey of **2,000 students**, between May 3 – 17, 2022, from a national panel of students.

The margin of error at the 95% confidence level is +/- 2.2%. The margin of error on sub-samples is greater.

Global Strategy Group conducted an online survey of **2,047 students**, between October 6 - 13, 2022, from a national panel of students.

The margin of error at the 95% confidence level is +/- 2.2%. The margin of error on sub-samples is greater.

Global Strategy Group conducted an online survey of **1,000 parents**, between October 5 - 13, 2022, from a national panel of parents.

The margin of error at the 95% confidence level is +/- 3.1%. The margin of error on sub-samples is greater.

Demographics

Grade of School

9th grade	26
10th grade	28
11th grade	19
12th grade	26

School Type

Public district school	73
Private or parochial school	8
Public charter school	8
Home school	10
Other	2

Disability

Identify with a physical, cognitive, or learning disability	12
Mental health challenges	16
Cognitive or learning disability	6
Vision disability	5

Gender

Male	50
Female	48
Something else/prefer not to say	2

Race/Ethnicity

Black/African American	14
White/Caucasian	53
Hispanic/Latino	23
Asian/Asian American	8
All other	3

Region

Northeast	17
Midwest	21
South	38
West	24

Demographics

Grade of Child

9th grade	21
10th grade	28
11th grade	24
12th grade	27

School Type

Public district school	82
Private or parochial school	8
Public charter school	5
Home school	4
Other	-

Child with a disability

Yes	7

Child Gender

Male	52
Female	48

Gender

Male	46
Female	54
Something else/prefer not to say	-

Race/Ethnicity

Black/African American	11
White/Caucasian	55
Hispanic/Latino	24
Asian/Asian American	5
All other	5

Education

Non-College	69
College +	31

Engineering has a ‘concrete’ image and a gender divide on interest

- **Students think engineering is hard and requires skills they may not have**
  - Students’ top three descriptors:
    - Good at math and science
    - Smart
    - Builds, constructs, and makes things
  - Students identify math as their #1 reason for not pursuing engineering

- **To start, 18% of all students are very interested in a career in engineering**

% of students very interested in a career in engineering

All Students	Male	Female	Male			Female			Attend Public School	Attend Private/ Charter School	Identify with a disability
			White	Black	Hispanic	White	Black	Hispanic			
18%	24%	11%	25%	23%	23%	12%	11%	9%	17%	26%	20%

Parents can be allies in promoting careers in engineering

- **Students trust parents more than anyone for career advice**
  - Moms are the most trusted and consulted career counselors
  - Dads are second
  - Close friends and adults that "*work in a field I would consider*" are the **third most trusted** career influencers

- **Engineering meets students' financial concerns and career aspirations**
  - Financial security, interesting work, and making a difference are top career motivators
  - Both parents and students would pitch a career in engineering to others by focusing on the ability of engineers to help others and "change the world."

- **Not all paths to a career in engineering require a degree. This is news.**
  - Over half of students and parents initially believe that a Bachelor's degree is necessary for a career in the field of engineering
  - The message that "engineering is a career that is open to everyone. You don't need to graduate from a four-year university to have a successful career in engineering," appeals to both parents and students.

Student interest in engineering grows with exposure to profiles of engineers and key messages

- **The "Base" – already very interested in pursuing engineering**
  - 13% of overall student population
  - The "Base" looks like the current engineering student population, more likely to be:
    - White
    - Male
    - Attend private/charter school
    - Plan on attending 4-year college

- **The "Movers" – may be persuaded to consider engineering**
  - 34% of overall student population
  - "Movers" looks like the target groups needed to diversify the engineering field, more likely to be:
    - Students of color
    - Female
    - Plan to attend a community college or are undecided on plans

Show students what a career in engineering looks like by showing them engineers who look like them

- **Profiles of engineers and people who work in engineering can drive student interest in careers**
  - When students can see themselves in the images and profiles of engineers who look like people they may aspire to be, they're more receptive to the idea of pursuing a career in engineering…
  - …that means that female students respond more positively to profiles of female engineers, and Black girls and boys respond more positively to profiles of Black engineers.
  - Bios of video game developers and NASA engineers were appealing and boosted interest in engineering among students.

Strengthen all communication with effective messaging

- **Engineering is a "well-paid and prestigious field" that "sets students up for success"**
  - Is both appealing and believable and speaks to concerns that both parents and students have about finances.

- **Engineers can make "a world of difference"**
  - A top testing message from Changing the Conversation, the updated message is still an appealing and believable message for both parents and students.

- **Engineering is a career that is "open to everyone"**
  - While highly appealing across all demographic groups, but not everyone believes that it is true.

The Base & The Movers

Students: Interest in Engineering

Student Interest Targets

Base
Always very interested in pursuing engineering

- Male (18%)
- Parents have a college degree (16%), and work in engineering (23%)
- Intend to attend a 4-year college (18%)
- Attend a private/charter school (23%)
- Lives in Northeast (15%)

Movers
Interest increases to very or somewhat interested in engineering

- Black female (38%) and Hispanic female (42%)
- Identify with a disability (42%)
- Non-college educated parents (37%)
- Plan to attend a community college (38%) or undecided on their future plans (39%)
- Lives in Northeast (37%) or South (36%)

Resistant

Parents: Approval of Engineering

Parent Approval Targets

Base

Engineering is always a very good choice of a career

- Male (51%)
- College grads (51%)
- Employed (48%)
- Parents of male children (49%)
- Child in private/charter school (55%)
- High-income (50% make more than $100K/year)

Movers

Move to say engineering is a very good, good, or fair choice of a career after messaging

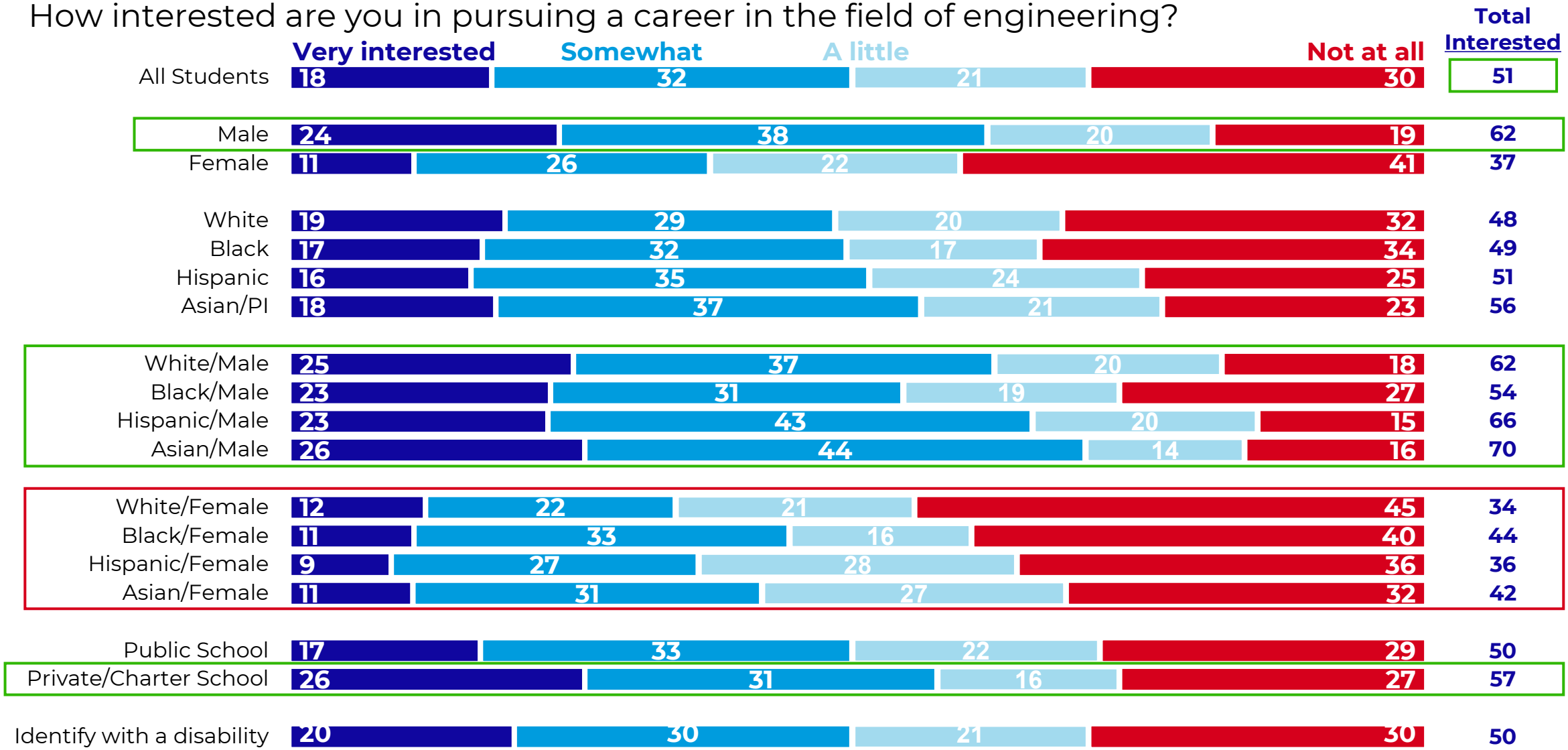
- Female (23%)
- Non-college grads (24%)
- Black (30%)
- Parents of female children (24%)
- Child with a disability (28%)
- Lower-income (29% make less than $50K/year)

All Others

Perceptions of and Interest in Engineering

Student interest in engineering

How interested are you in pursuing a career in the field of engineering?



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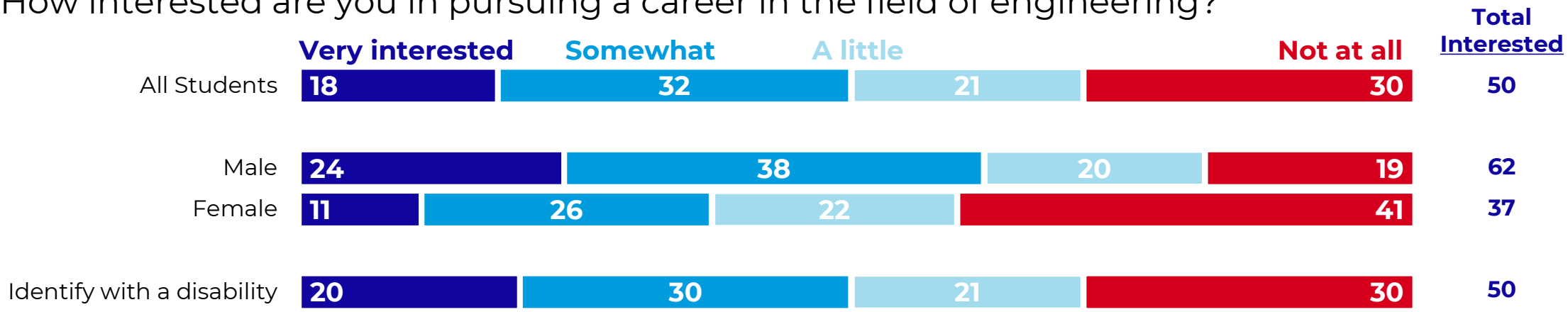
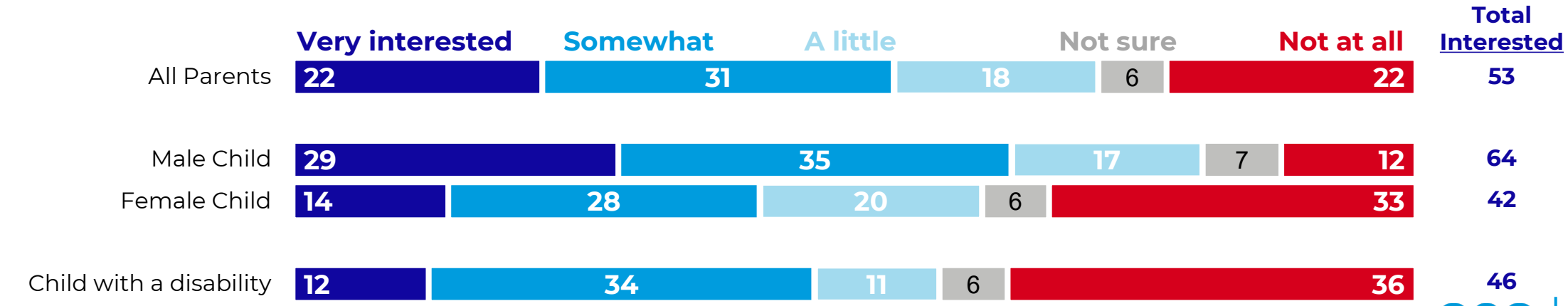
Students are interested in engineering, and parents appear to accurately assess their child's interest

How interested are you in pursuing a career in the field of engineering?

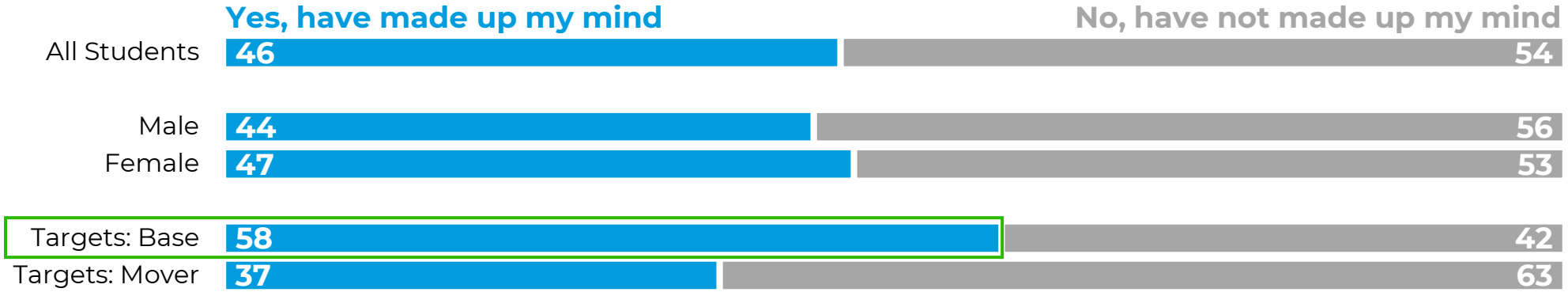


Thinking now about your child, how interested are they in pursuing a career in engineering?



Students have not made up their mind yet about their career, but those who have lean towards engineering and medicine

Not everyone has made up their mind about what they will choose as a career, have you chosen a field in which you would like to work for your career?



[IF YES] What field have you chosen to work in your career?

	% coded responses	Male	Female
Engineer	4%	6	2
Health care/medical	4	2	5
Veterinarian/zoologist/work with animals	3	1	4
Computer science/programming/software engineer	2	4	1
Psychology/Therapist/Counselor	2	<1	4

Other Responses

- Nursing
- Doctor/surgeon
- Education
- Game Design
- Military
- Business
- IT/Cybersecurity
- Fine arts
- Attorney/law
- Trades/electrician/carpenter /welder/plumber
- Scientist
- Professional athlete/sports management
- Accounting/finance
- Esthetician/cosmetology

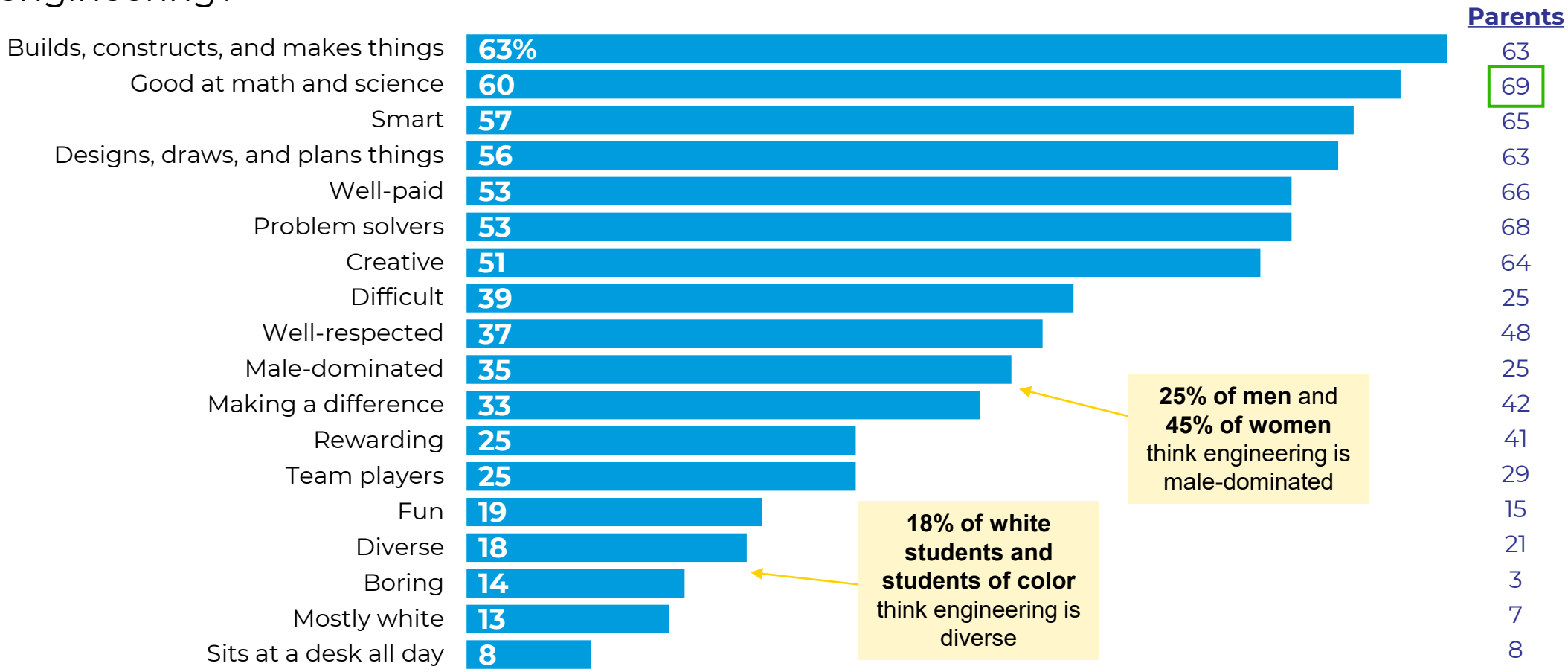
Male students are much more likely than female students to have decided to pursue becoming an engineer.

Have you chosen a field in which you would like to work in for your career?

				Male				Female				
	Overall	Male	Female	White	Black	Hispanic	Asian/PI	White	Black	Hispanic	Asian/PI	Disabled
Engineer (including mechanical and aerospace)	4%	**6**	2	**6**	**3**	**4**	**9**	2	2	<1	1	3
Computer science/ programming/ software engineer	2	4	1	3	2	4	11	<1	2	<1	4	3
Game Design	2	3	<1	3	3	3	-	<1	1	-	2	5
Architect	<1	<1	<1	1	-	-	2	-	<1	<1	1	-
Robotics	<1	<1	-	1	-	-	2	-	-	-	-	<1

Most students think building, construction, and math and science best describe the field of engineering

Below is a list of words or phrases…What words or phrases do you think describe engineers or the field of engineering?*



*Data comes from student survey conducted in May

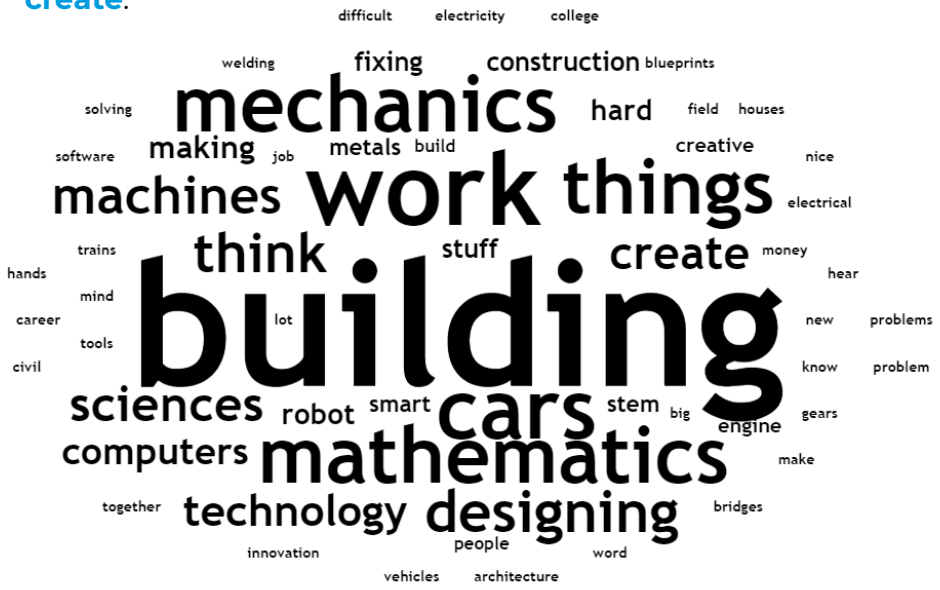
Similar to students, parents think of building and math when they hear “engineering”

What words come to mind when you see or hear the word ENGINEERING?

Students

“**New, modern, design, build construct, reimagine, create**.”

“**Working with your hands**”



“I think of a **construction site** with someone **looking at blueprints** for something to build.”

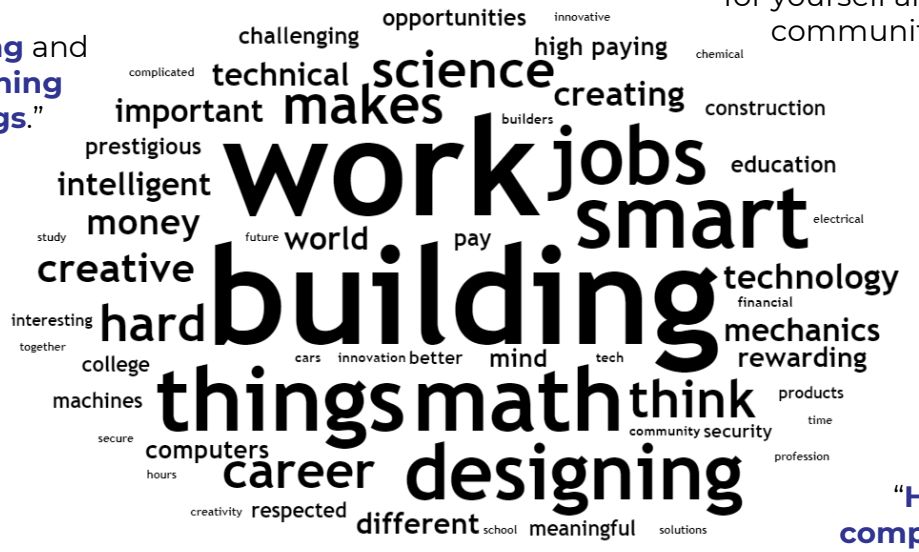
“**Creating** something new”

Parents

“**Good pay**, **job security**, **challenging**, **rewarding**.”

“Very **well-respected job**. Pays very well. You’re doing **meaningful work** for yourself and the community.”

“**Building** and **designing things**.”



“**Hard**, **complicated**, **math**.”

“When I hear the word engineering, I think of an excellent field for someone to be in. **It is hard and you have to be very smart, but it is rewarding** in all aspects.”

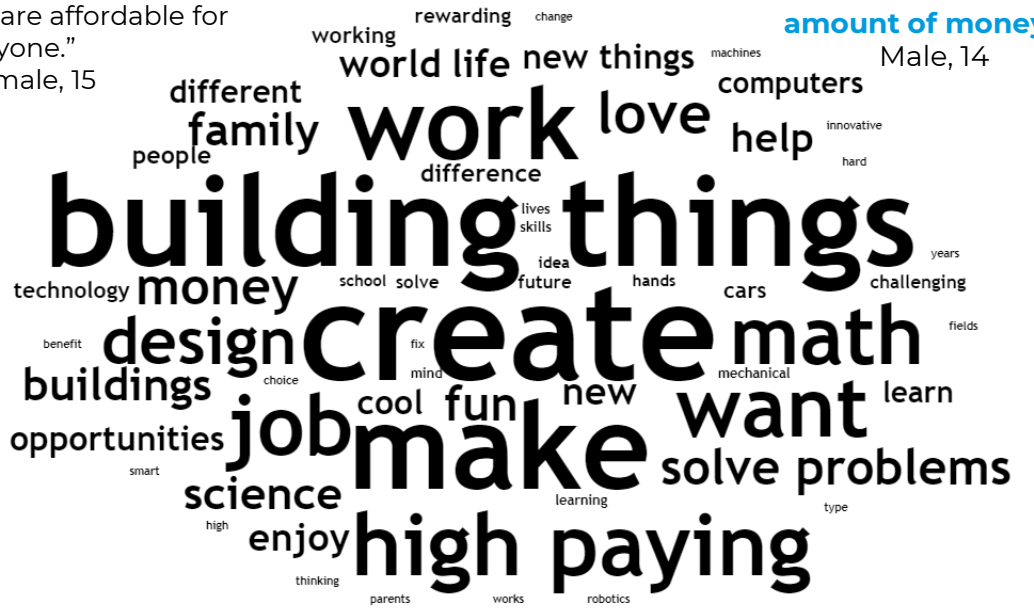
“**Making a difference** in society by **creating or building things**.”

Students are interested in engineering for making and building things; those who aren't interested are wary of math

Why are you **very/somewhat/a little** interested in a career in the field of engineering?

"I am interested in **creating new technology** that will **aid the world** in living more efficiently and making things that are affordable for everyone."
– Female, 15

"It seems like a very good opportunity to **create new things and make a decent amount of money**." – Male, 14

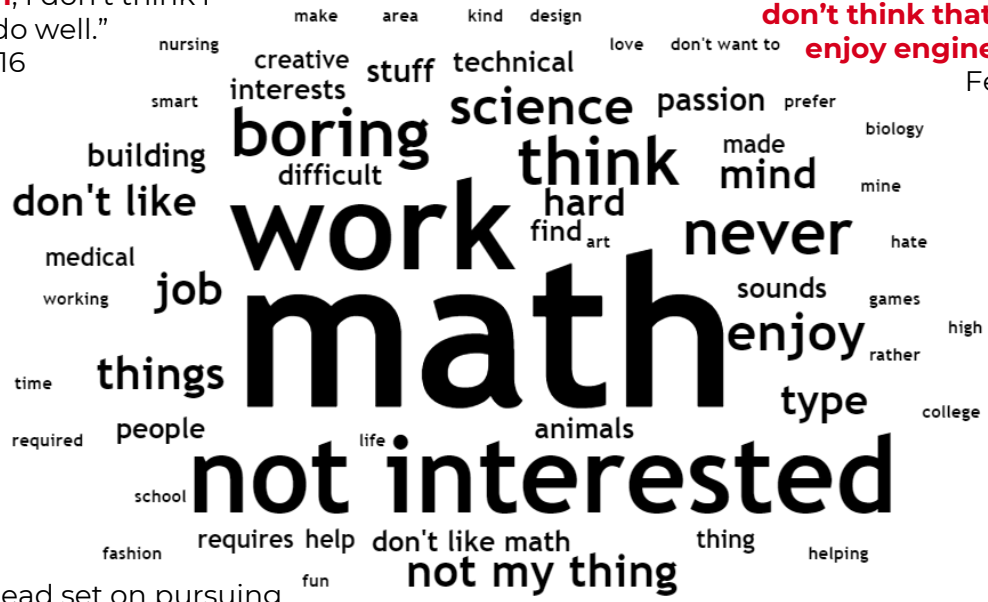


"Both my parents work in fields related to engineering, and I **enjoy working with tools**, **planning things out**, and **building things**. Furthermore, my current **favorite subjects are math and science**, two things that I'll put to use in the field of engineering." – Male, 15

Why are you **not at all** interested in a career in the field of engineering?

"The thought of engineering is honestly **very scary** and from someone who's **not good at math**, I don't think I would do well."
– Male, 16

"It **seems like something I would not particularly excel at**. I also would like to enjoy my job, and I **don't think that I would enjoy engineering**." – Female, 17



"I am dead set on pursuing the arts for my career, though I don't know specifically what I'll be doing. **While I don't mind engineering, it's just not what I want to dedicate most of my life to**." – Male, 17

"**Too many men, and boring**." – Female, 17

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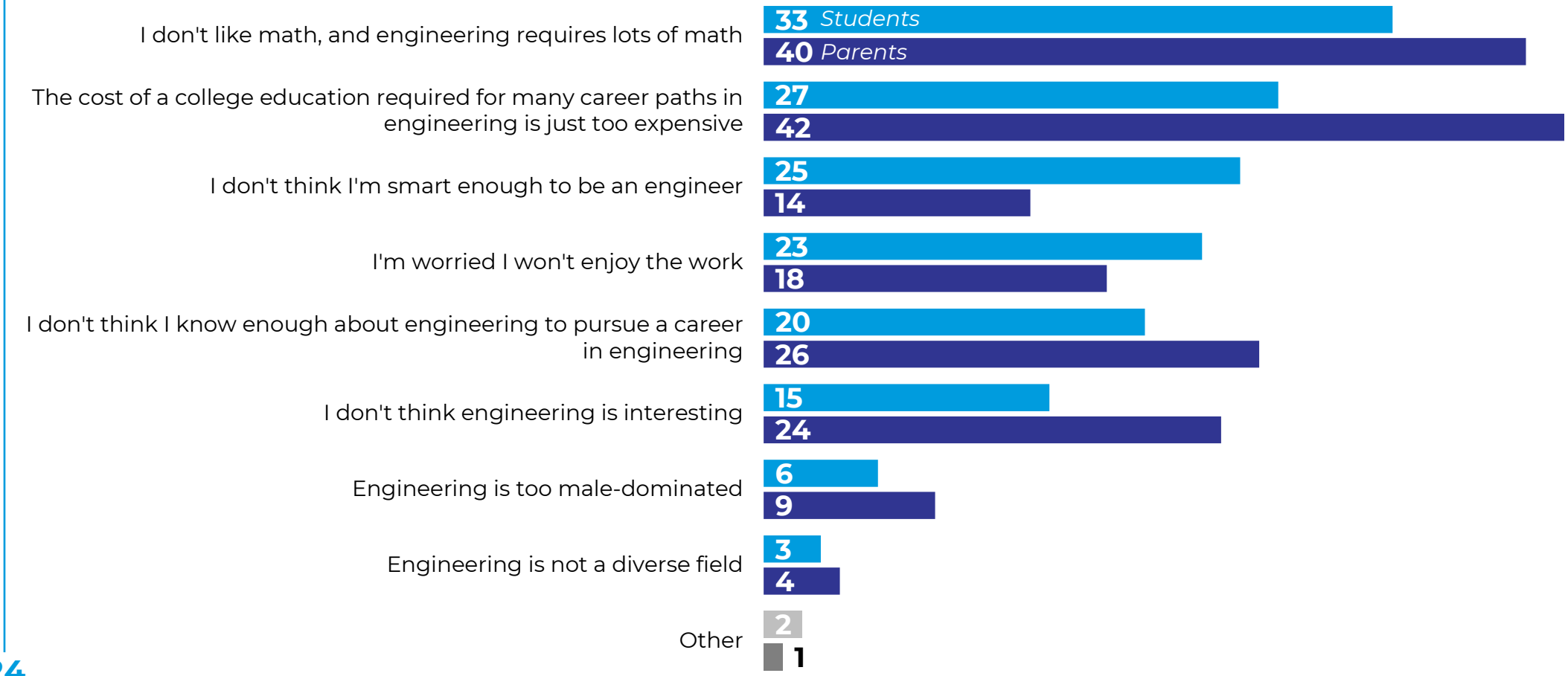
Students identify math as their #1 reason for not pursuing engineering, parents are more concerned by debt

Below are some reasons students have identified for not pursuing a career in engineering...select the top two most convincing reasons to you [your child] to not pursue a career in engineering.



Few students can name a current or well-known engineer

Can you name any current, well-known engineers?*

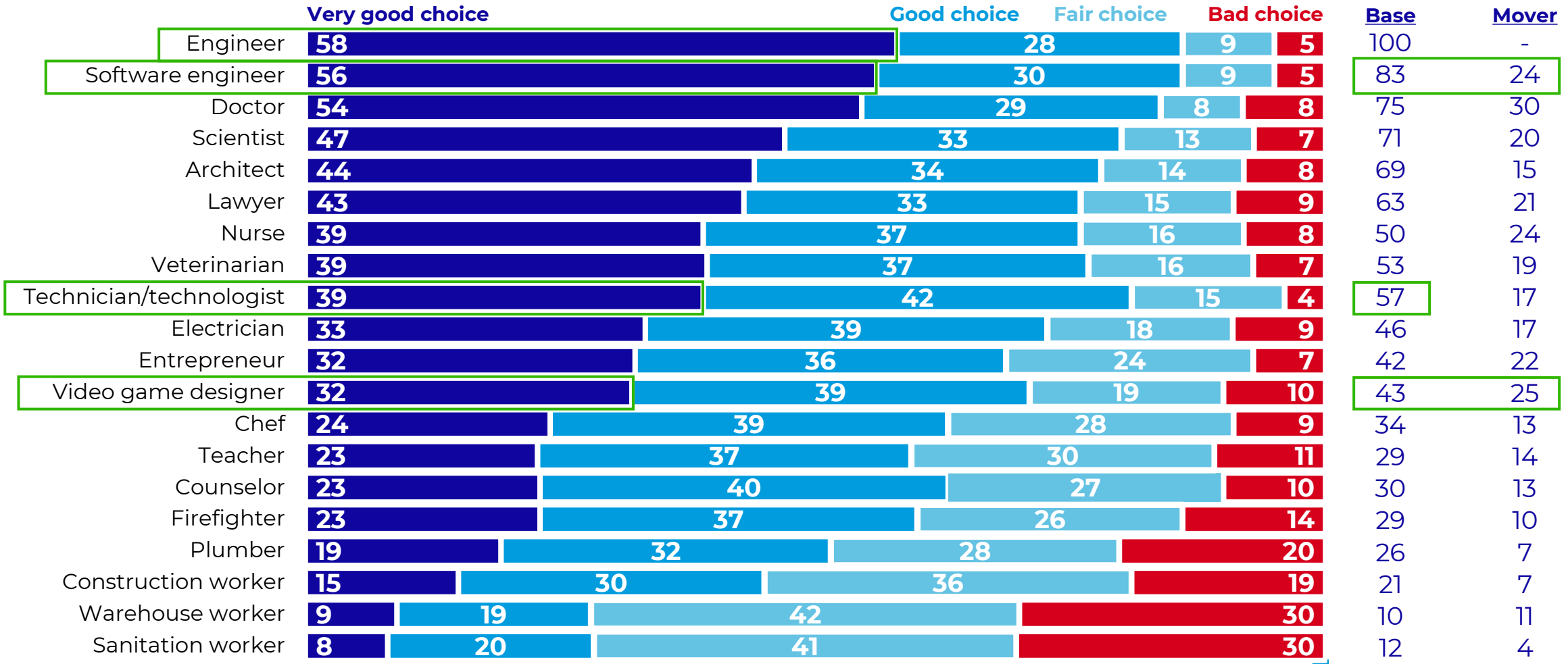
Named by less than 1%

Mark Rober
Bill Nye
Jeff Bezos
Albert Einstein
Leonardo Da Vinci
Bill Gates
Henry Ford
James Watt
Alexander Graham Bell
Wilbur and Orville Wright
John Perkins
Mark Zuckerberg
Julius Berger
Ada Lovelace
Zaha Hadid
Karen Bausman

*Data comes from student survey conducted in May

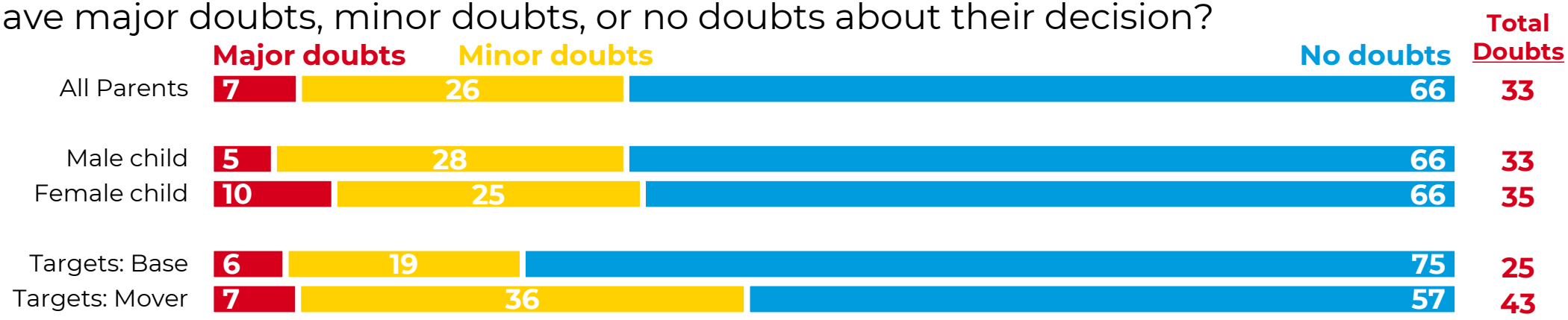
Parents have a positive impression of most lines of work, but Engineering rises to the top

Choice of professions or careers...

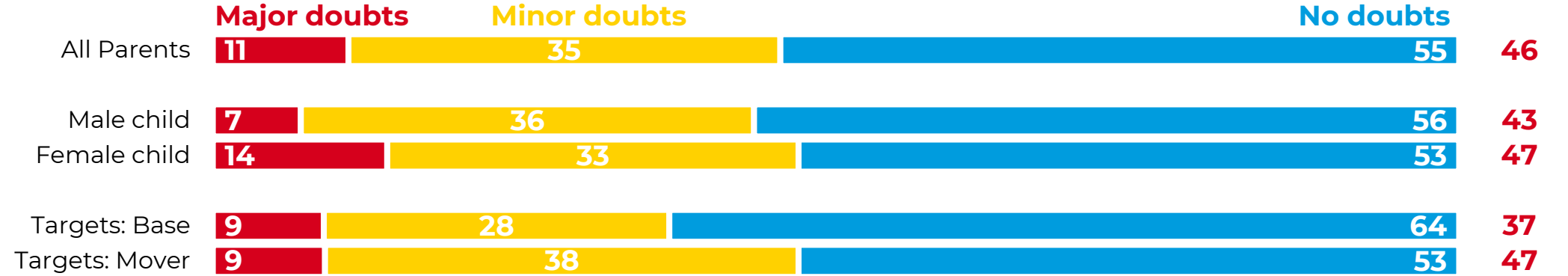


Parents would feel comfortable with their child pursuing a career in engineering with a Bachelor's degree

Some careers in engineering call for a **Bachelor's degree** from a four-year college. If your child were to enter a four-year college program with the intention of becoming and engineer, would you have major doubts, minor doubts, or no doubts about their decision?



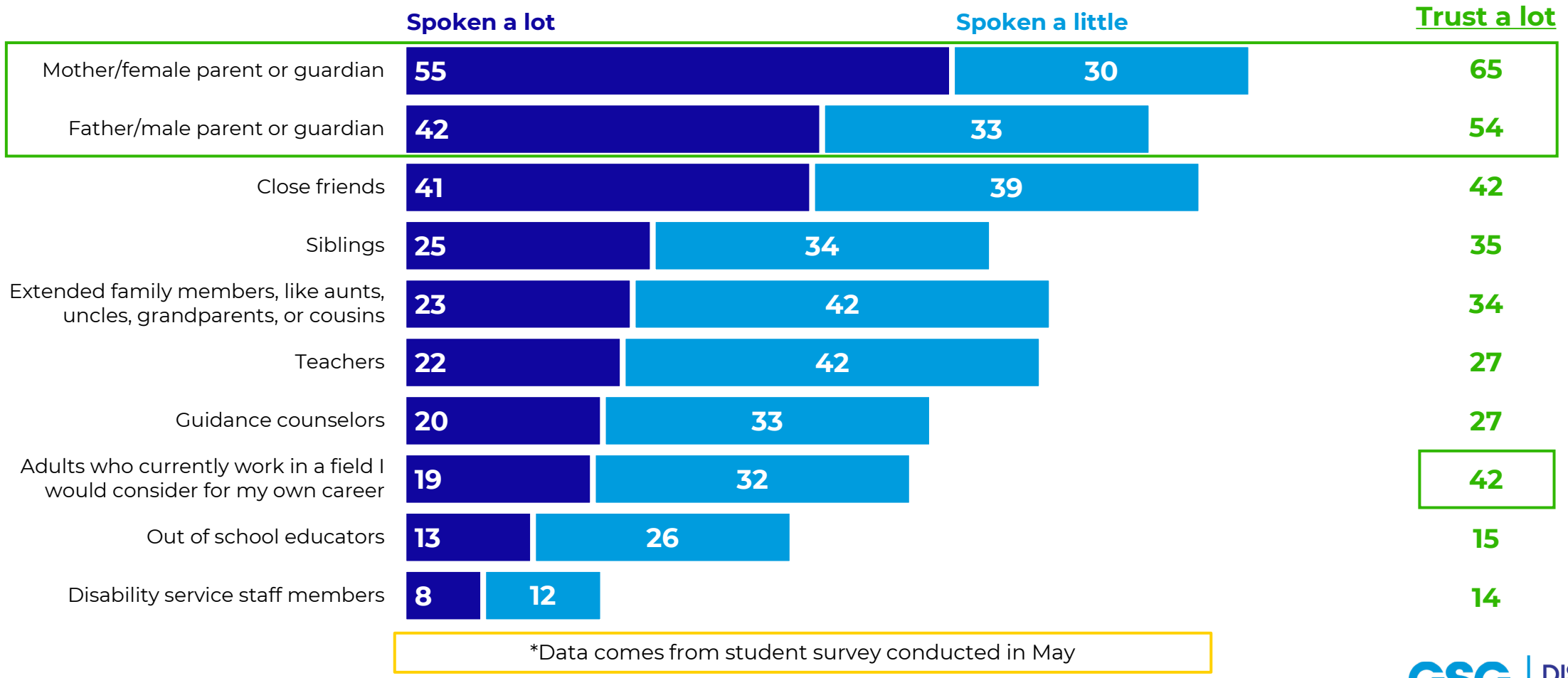
Some careers in engineering call for an **Associate's degree** from a two-year college program…



Career Influencers and Priorities

Students have mostly spoken to and trust their parents/guardians about their future career

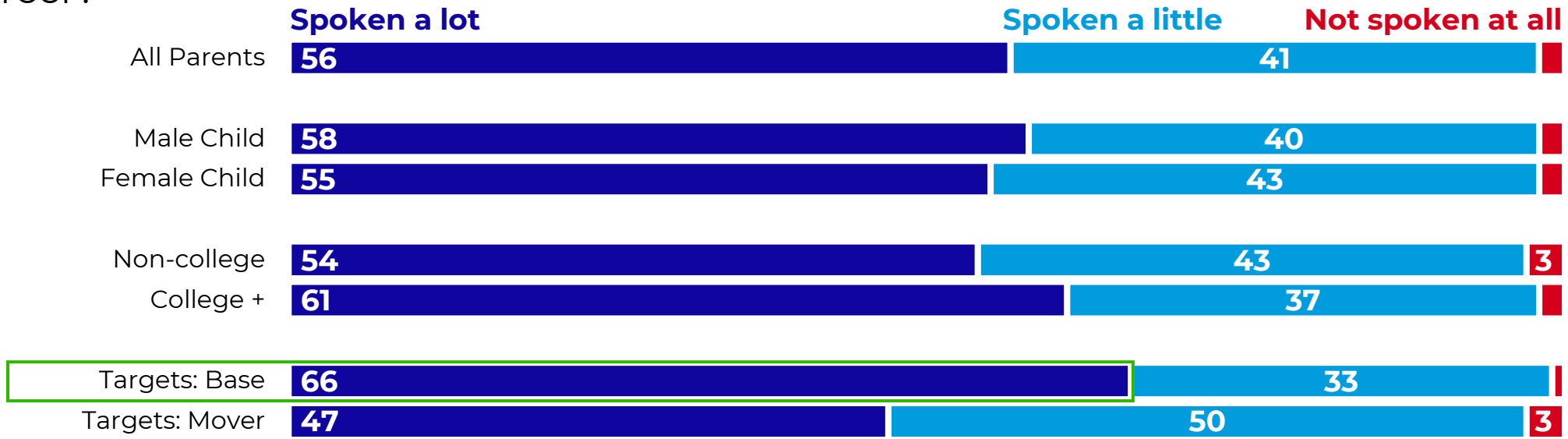
How much have you spoken to each of the following people about careers or what you might do in the future for a career?



*Data comes from student survey conducted in May

Parents have spoken to their children a lot about their future career

Have you spoken with your child about careers or what you they might do in the future for a career?



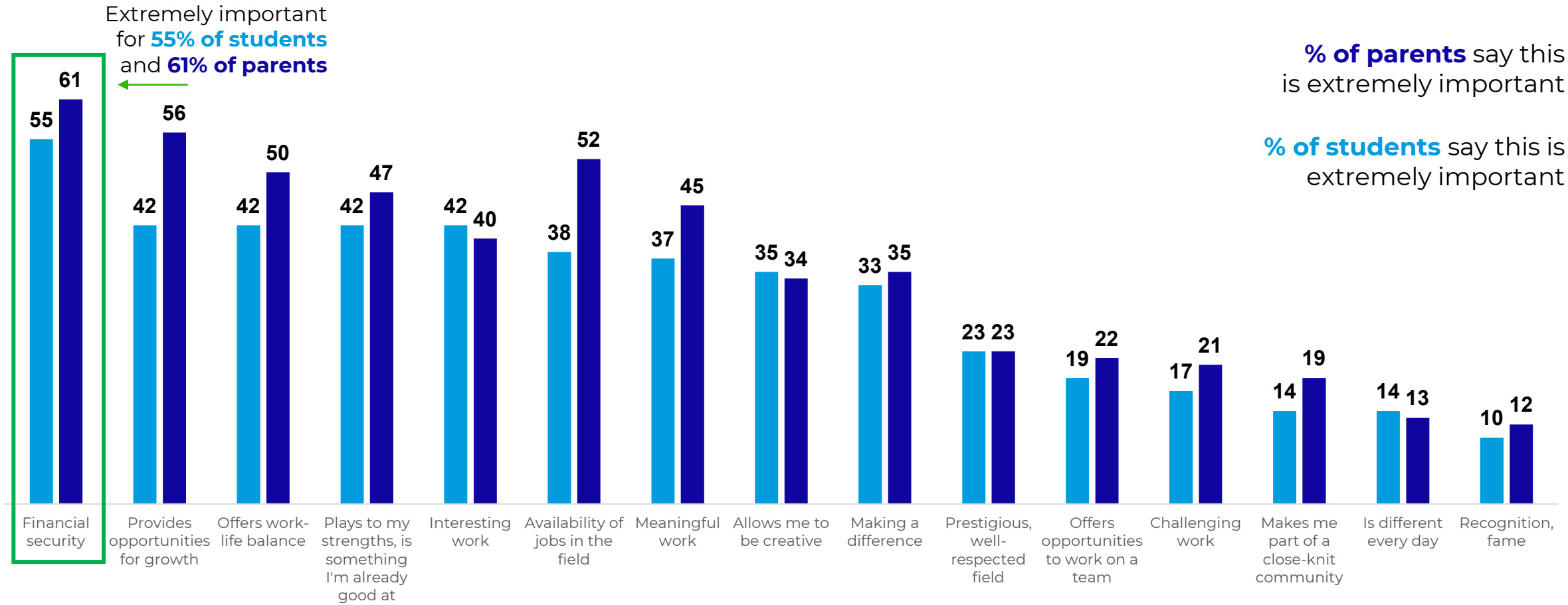
How much have you spoken to each of the following people about careers or what you might do in the future for a career?*

*Student data comes from student survey conducted in May

After the economic volatility of the COVID-19 pandemic, financial security is paramount in career priorities both among parents and among students.

Parents value most career priorities slightly more than students; both prize financial security the most

Please indicate how important each of the following [is to you in considering which career to get into/should be to someone starting a career.] **% *Extremely Important***



Parents and students firmly align on values like financial security and personally rewarding work

When forced to make a choice, parents and students align on values…

Going to college > Starting a career right away

And they prioritize…

Financial security

Personally rewarding

Doing meaningful work

Parents and students differ on prioritizing…

Students prioritize…			*Parents prioritize…*		
High paying job	>	Not taking on lots of debt	High paying job	=	Not taking on lots of debt
Making a difference in your community	=	Making a difference in the world	**Making a difference in your community**	>	Making a difference in the world

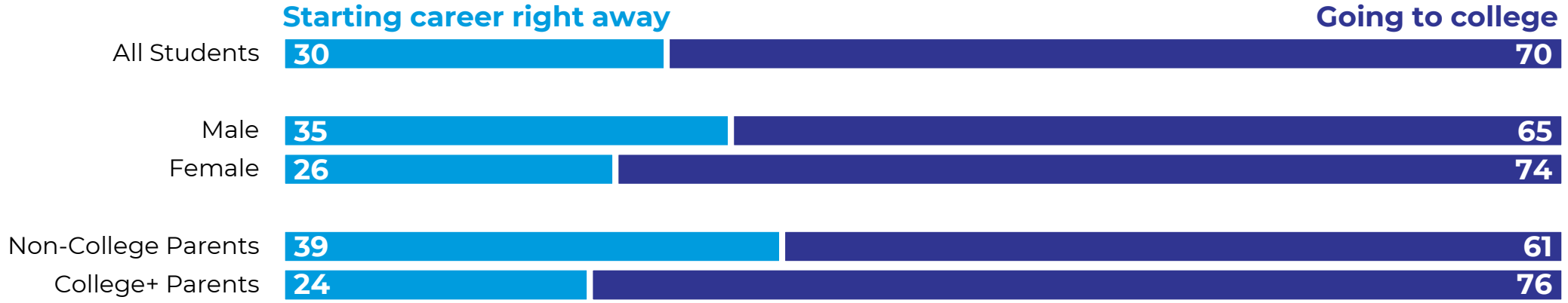
Students are driven to solve problems and are unfazed by the challenges facing their generation

When forced to make a choice students prioritize…

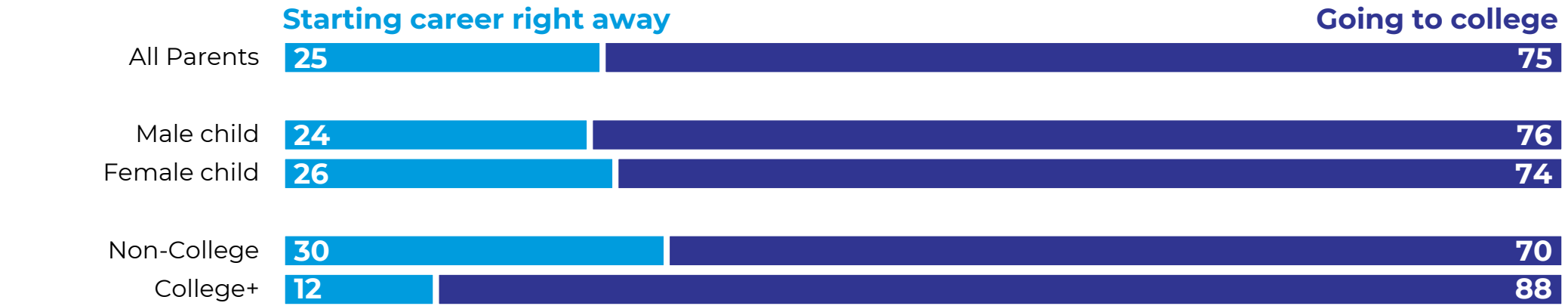
Every generation has had its own challenges it has to address, and ours is no different	>	There's too much pressure on young Americans to solve future problems
Solve problems	>	Create new things
Working outside of a traditional office	>	Working in a traditional office
Working independently	=	Working in a team

Both students and parents prioritize going to college over starting a career right away

Which is more important to you in your future career…?

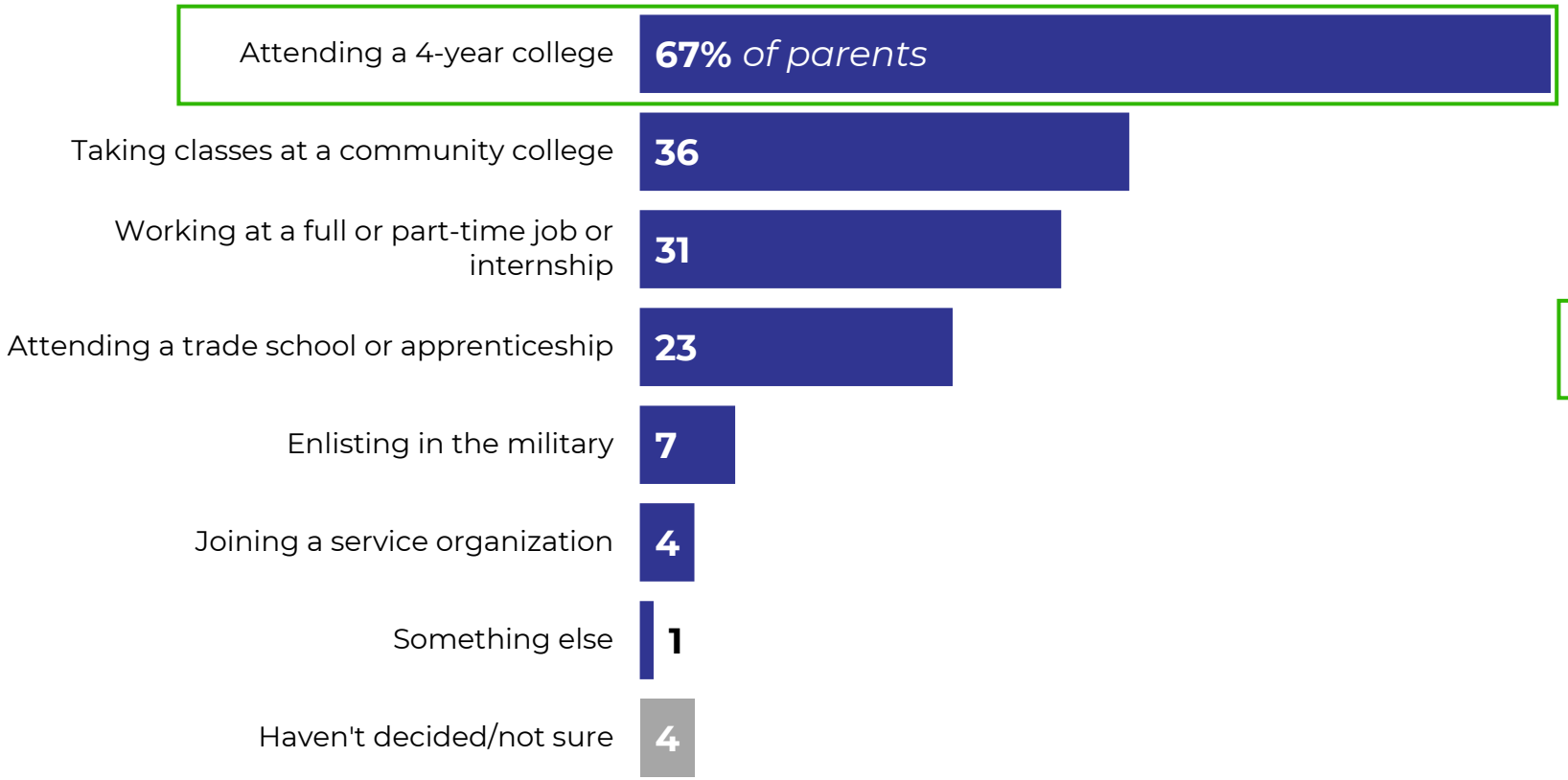


Which do you think should be more important to someone starting a career…?



Most parents hope their child goes to a 4-year college

When your child graduates high school, what do you hope they will be doing next? (Multiple responses allowed)



	Male Child	Female Child	Non-College	College +	Base	Mover
Attending a 4-year college	68	66	59	85	78	56
Taking classes at a community college	35	36	41	24	37	30
Working at a full or part-time job or internship	33	29	34	24	29	38
Attending a trade school or apprenticeship	28	19	26	18	25	22
Enlisting in the military	9	5	8	5	8	10
Joining a service organization	6	3	3	7	7	2
Something else	1	1	1	-	1	1
Haven't decided/not sure	3	4	4	2	2	5

After several years of economic volatility, financial security is a priority over making a difference

Which is more important to you in your future career…?

Which do you think should be more important to someone starting a career…?

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Both parents and students prioritize financial security over meaningful work

Which is more important to you in your future career…?

Which do you think should be more important to someone starting a career…?

Financial security is more important to students and parents than prestigious and well-respected careers

Which is more important to you in your future career…?

Which do you think should be more important to someone starting a career…?

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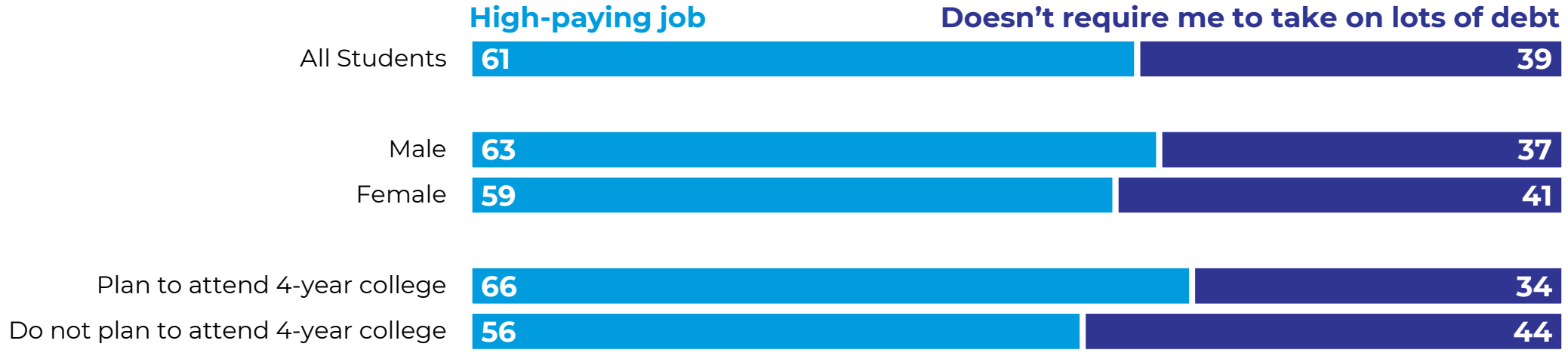
Students are more likely to value long-term earnings, while parents are slightly more concerned with debt load

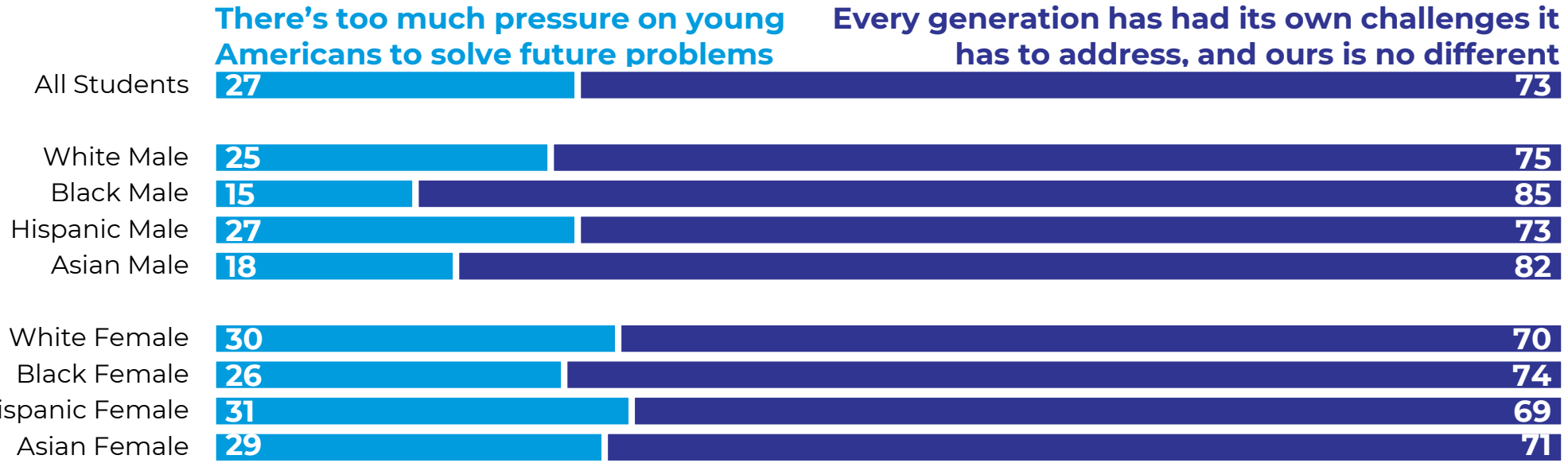
Which is more important to you in your future career…?



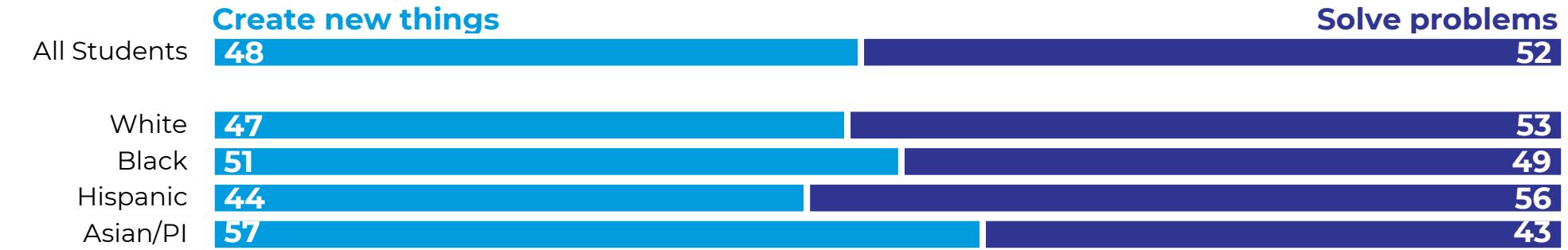
Which do you think should be more important to someone starting a career…?

Students are undaunted by the challenges facing their generation and open to both solving problems and creating

Which statement do you agree with more…?

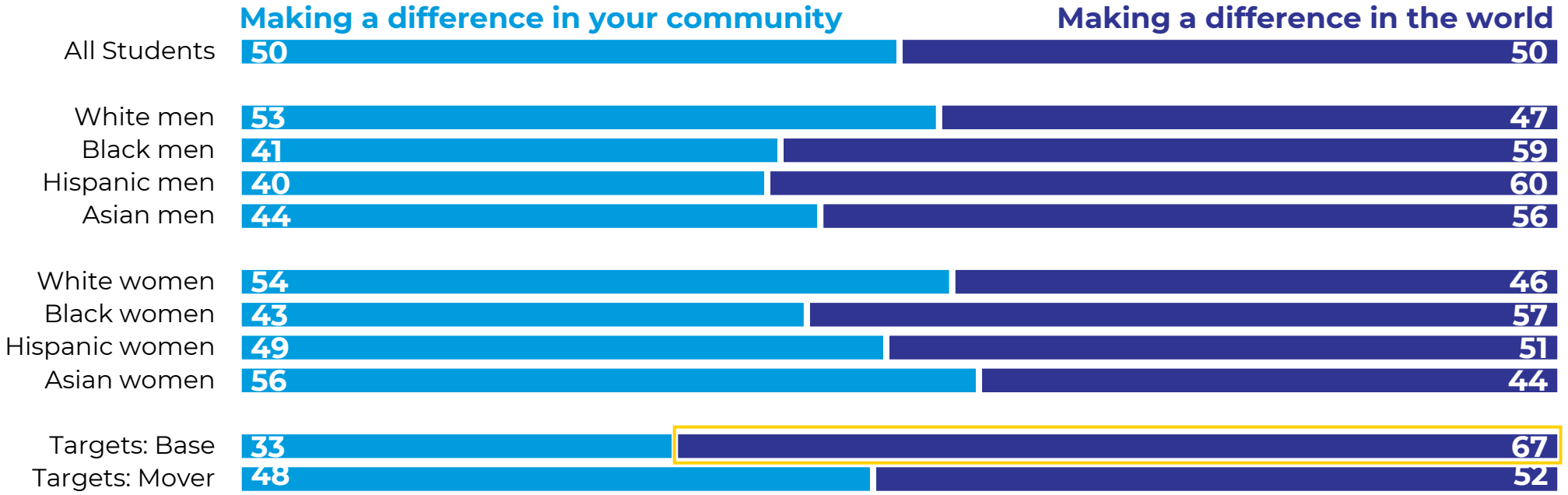


In your future career are you more interested in working to….?



Students are split on making a difference in the world or their community, while their parents prioritize community

Which is more important to you in your future career…?



Which do you think should be more important to someone starting a career…?

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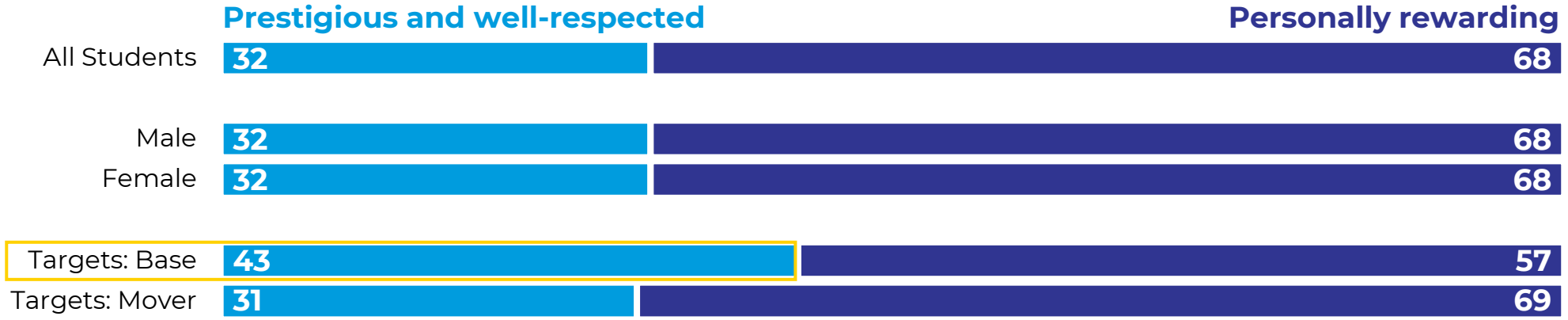
Students value personally rewarding work over prestige, parents even more so

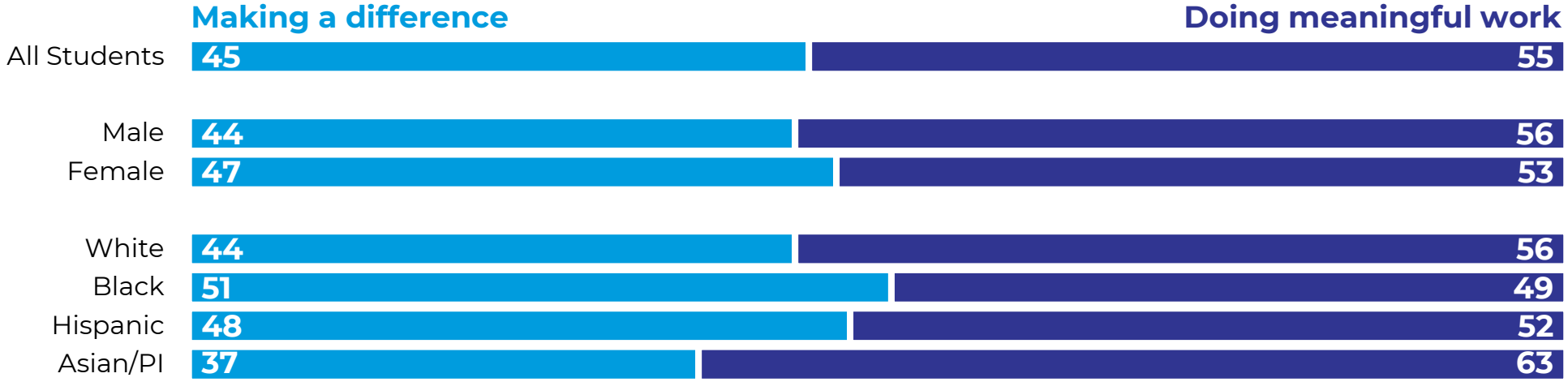
Which is more important to you in your future career…?



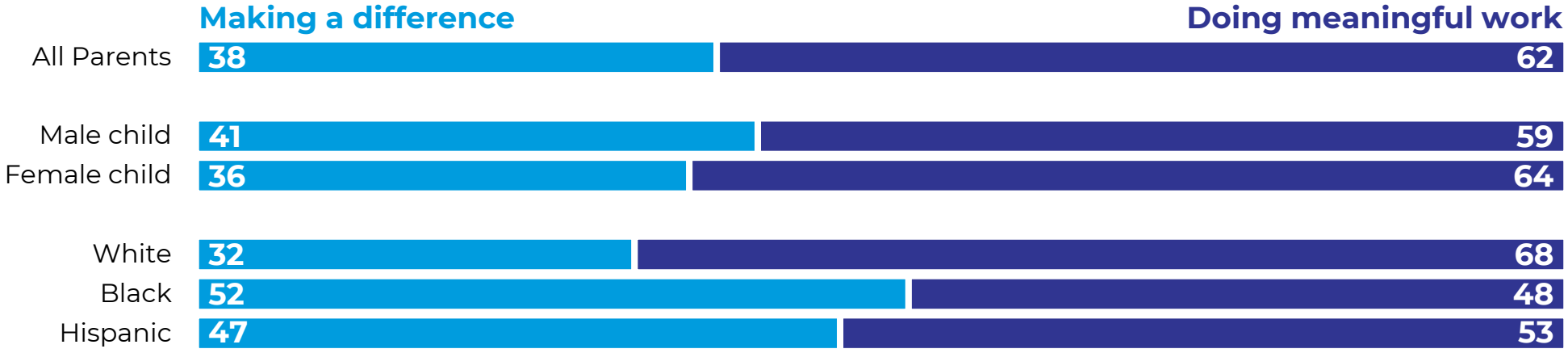
Which do you think should be more important to someone starting a career…?

Parents are slightly more likely to prioritize meaningful work than students

Which is more important to you in your future career…?



Which do you think should be more important to someone starting a career…?



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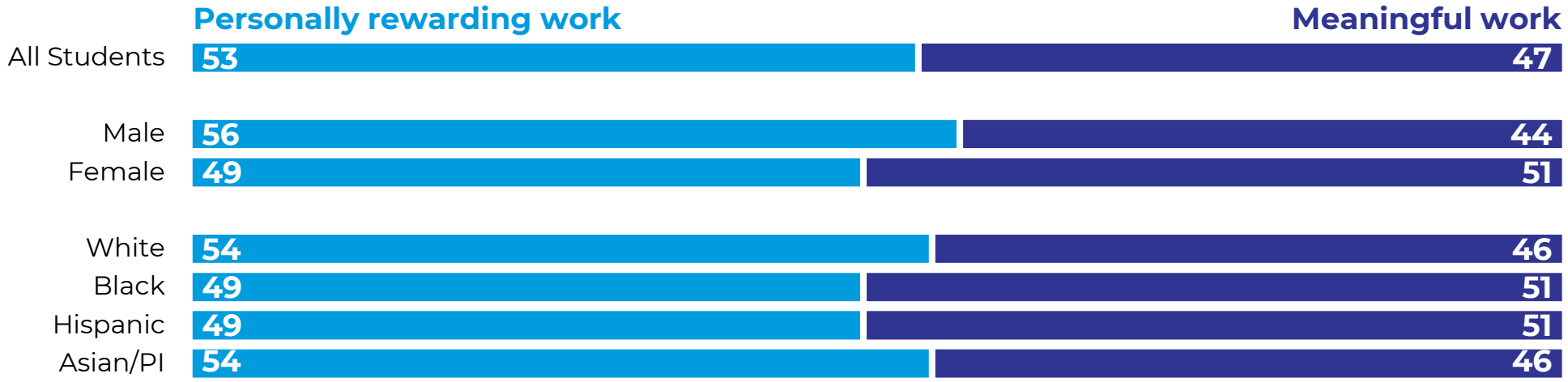
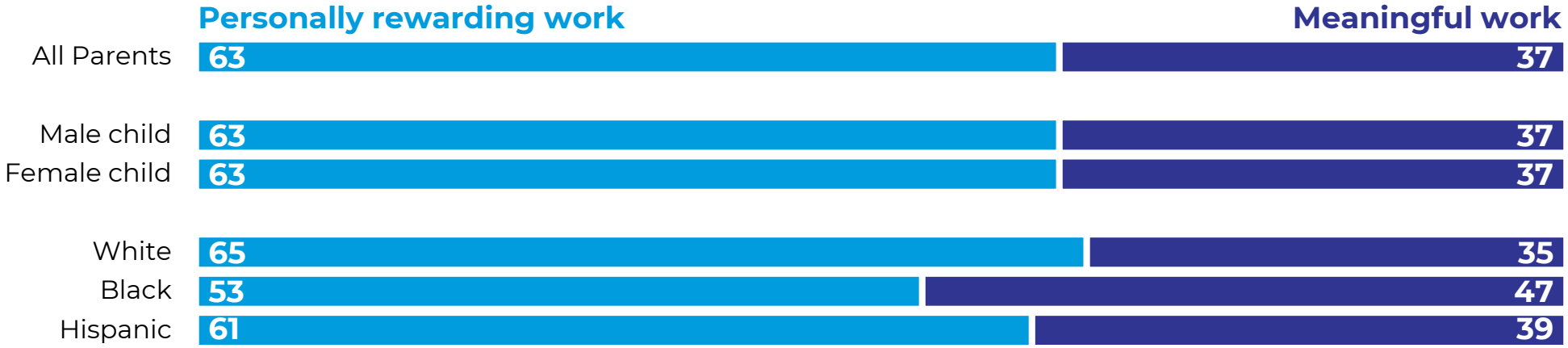
Personally rewarding work is clearly preferred by parents over meaningful work, less strongly preferred among students

Which is more important to you in your future career…?



Which do you think should be more important to someone starting a career…?



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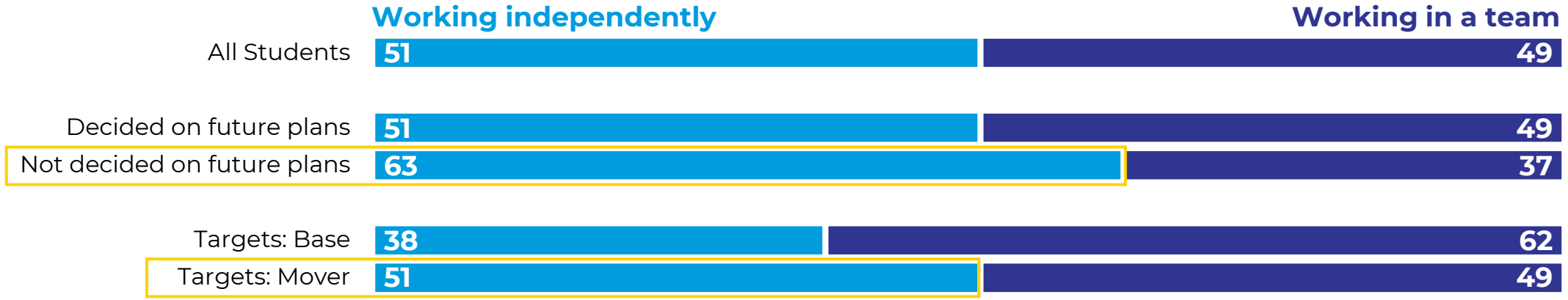
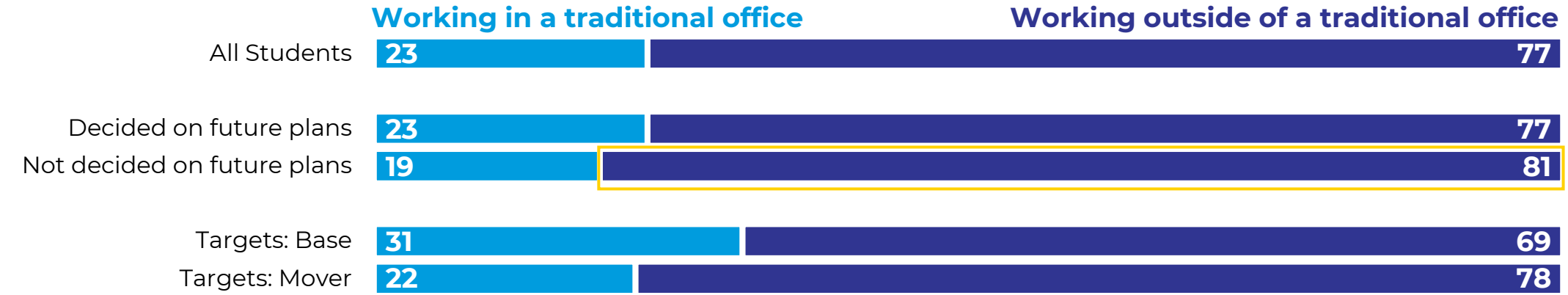
Students are split on working individually vs. working in a team, but prioritize working outside of a traditional office

Which is more important to you in your future career…?

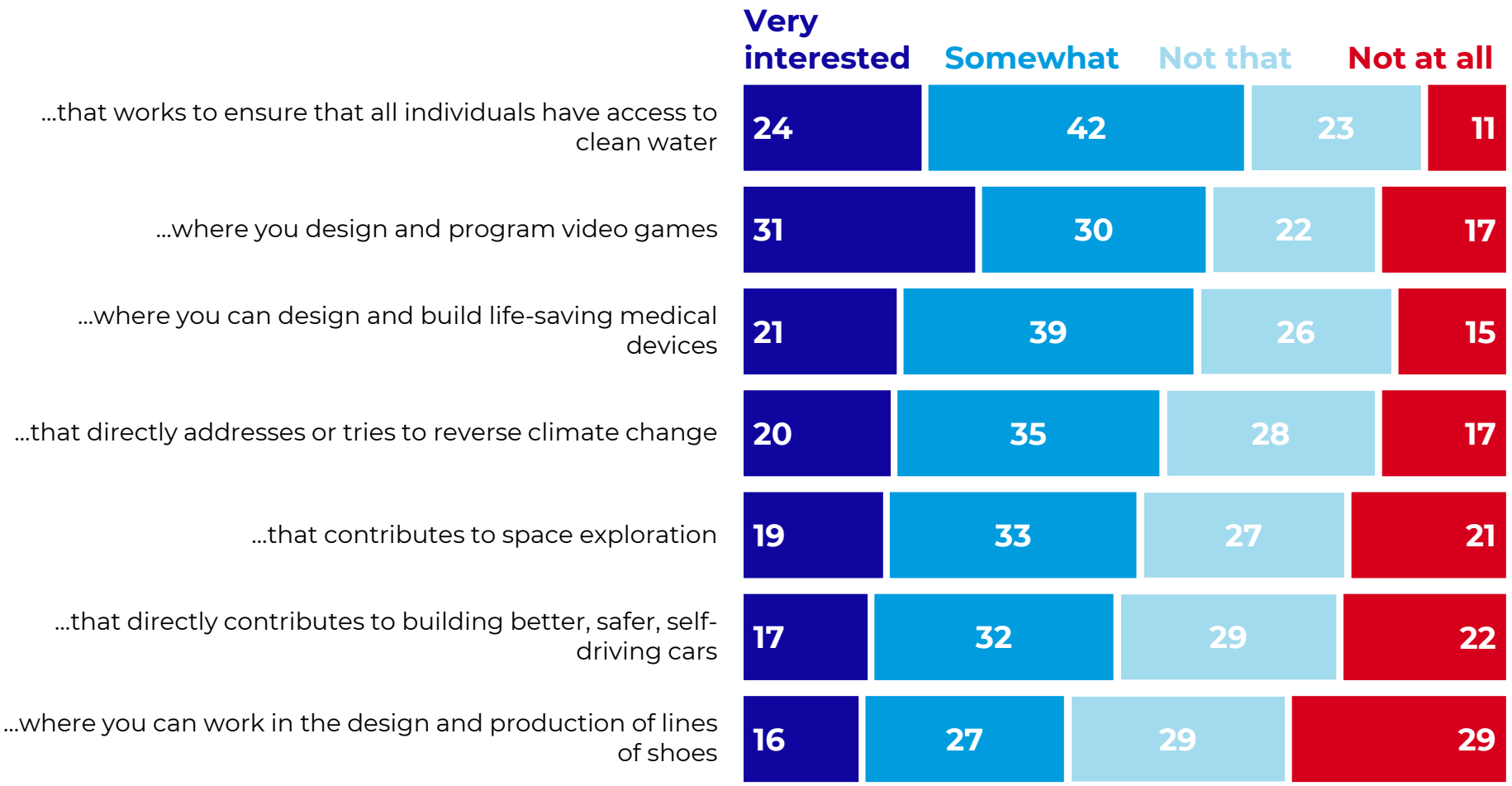


Which is more important to you in your future career…?



Students want to pursue a career that allows them to ensure access to clean water and program video games

How interested are you in pursuing a career...?



Total Interested	All Students	Male	Female	Base	Mover
...that works to ensure that all individuals have access to clean water	66	67	65	85	75
...where you design and program video games	61	75	46	78	64
...where you can design and build life-saving medical devices	60	60	59	84	63
...that directly addresses or tries to reverse climate change	55	55	56	79	64
...that contributes to space exploration	52	60	43	78	58
...that directly contributes to building better, safer, self-driving cars	49	59	40	82	54
...where you can work in the design and production of lines of shoes	43	42	43	52	45

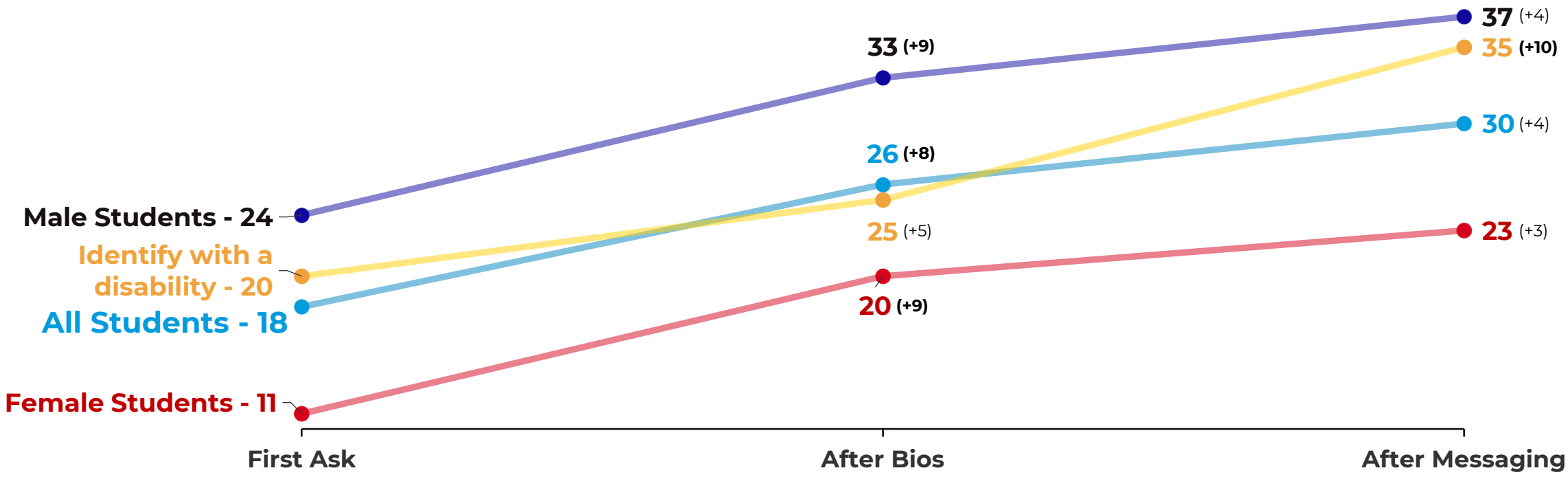
Attitudinal Movement

Students are more interested in engineering after reading biographies of engineers.

Messaging is most effective at reducing perceptions that a college education is not necessary to pursue some career paths in engineering.

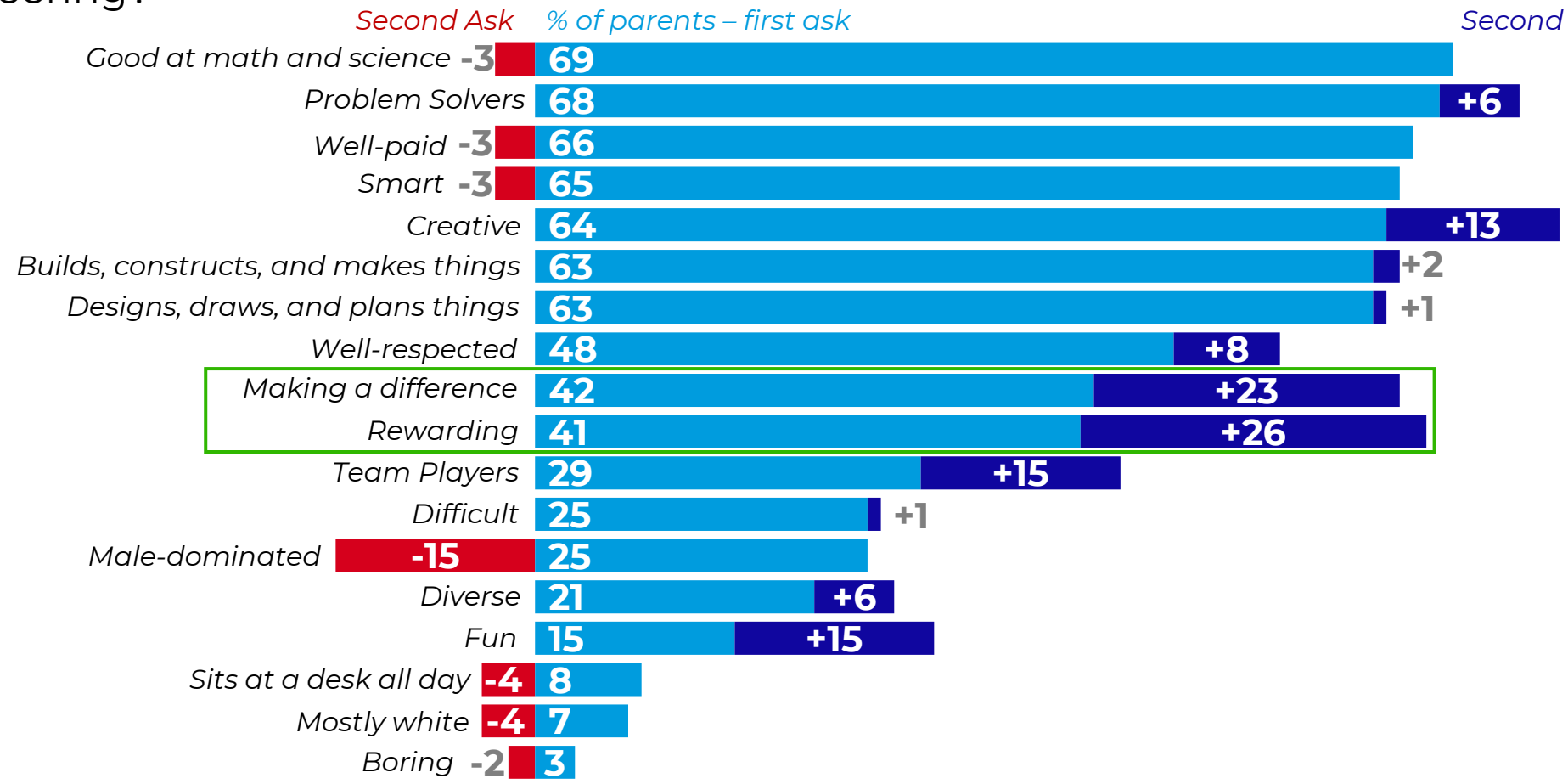
Student interest in engineering grows with exposure to biographies of engineers

How interested are you in pursuing a career in the field of engineering? *%Very Interested*



Messaging increases positive impressions for parents, that engineering is rewarding and can make a difference

Below is a list of words or phrases…What words or phrases do you think describe engineers or the field of engineering?

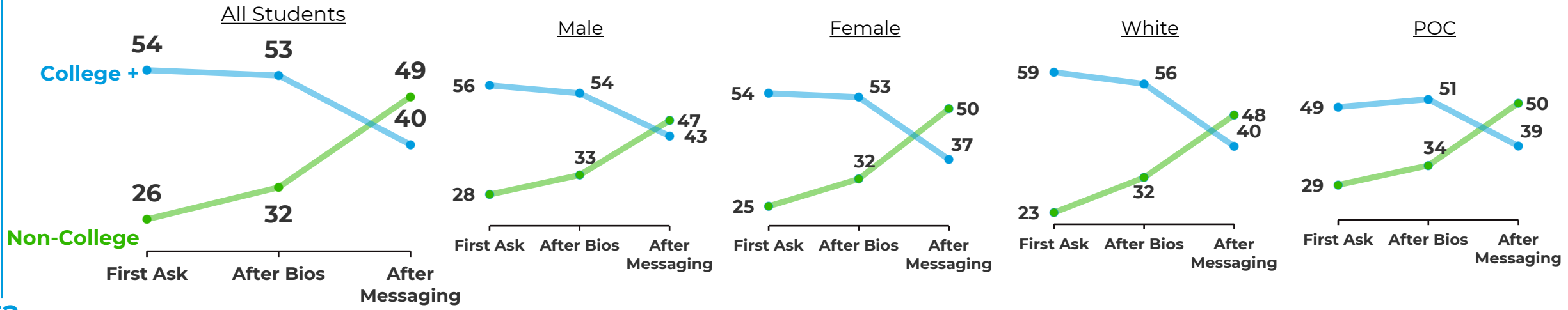


Parents and Students believe a Bachelor's degree is necessary for a career in engineering, messaging reduces this perception

Based on what you have heard, what is the minimum level of education necessary to become an engineer? *All Parents*

	All Parents	Male child	Female child	Non-college	College+	Child with a disability	Base	Target
Non-College	21	22	19	28	4	18	17	21
College +	69	71	69	59	94	67	76	68
Not sure	10	7	12	13	2	15	7	11

Based on what you have heard, what is the minimum level of education necessary for a career in the engineering field? *All Students*



Messaging

Full Text of Tested Messages

EVERYONE Engineering is a career that is open to everyone. You don't need to graduate from a four-year university to have a successful career in engineering.
PAY Engineering is a well-paid and prestigious field that sets students up for success. Engineering is in high demand with companies these days because they value people who can build new things. Even though it's becoming harder to afford the cost of living in America, studying engineering gives you financial freedom.
WORLD OF DIFFERENCE Engineers make a world of difference. From everyday things like elevators, TV, and electric lights – to newer innovations like self-driving cars and spaceships – they have helped build the world around us, and get us to new ones in the future.
CREATIVE – PROBLEM SOLVER Engineers are creative problem-solvers, building better, safer, self-driving cars, and designing smarter road systems to reduce traffic accidents and congestion.
SHAPE THE FUTURE Engineers help shape the future. They develop the latest tools and technology to expand space exploration and look beyond our solar system.
COMMUNITY There are countless challenges facing the world, but change can start at home. Engineers create things that improve the lives of those in their communities. Countless investors started developing something new and useful without fancy equipment, which went on to help the world later.
STICK WITH IT Engineering may seem intimidating, but it was hard for everyone at first. Engineering is just like anything else – you get the hang of it with time and practice. In fact, most engineers say they are glad they stuck with it. Once they got out of school, they found it more rewarding than they could have anticipated.

Full Text of Messages Tested

REAL WORLD
Engineers connect science to helping people in the real world. Two billion people struggle with access to clean water, which has inspired scientists and engineers to start developing ways to filter the salt from seawater to solve this global crisis.

CREATIVE
Engineers are creative, from creating chemical fragrances for beauty products to designing smarter road systems to reduce traffic accidents and congestion.

HEALTH, HAPPINESS, SAFETY
Engineering is essential to our health, happiness, and safety. From growing organs for transplants to ensuring that communities have access to clean water, it is impossible to imagine life without engineering.

TEAM PLAYERS
Engineers are team players who collaborate with people from all walks of life. Because the things they create are so ambitious, they have to connect with others to gain inspiration and knowledge, and then work together to make it into reality. These teams often have members from across the world, all working toward a common goal.

CAREER PATHS
Engineering is just the beginning of a professional journey with many paths. The skills you learn along the way open up all sorts of doors down the road. You don't have to become a chemist or build airplanes – you can lead a nonprofit or advise governments too. The possibilities are endless.

FUTURE
The world of tomorrow is counting on you to build a better future. Engineers can play a big role in solving longstanding problems by creating new things that make the world safer and more equitable. But without new engineers, we're at risk of losing generations of progress and innovation.

CLIMATE
Even though young Americans did not contribute to the problems of climate change or diminishing resources, we need the engineers of tomorrow to find solutions to them. We need to develop new technologies that reduce carbon in the atmosphere and increase cleaner alternatives, or things will get even worse very soon.

“World of Difference” is both appealing and believable among our Base Targets, “Shape the Future” among Movers

All Students	Targets	
	Base	Movers
Everyone (appealing)		Everyone (appealing)
Pay (appealing)	Pay (appealing)	Pay (appealing)
World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (believability)
Creative Problem Solvers (believability)	Creative Problem Solvers (believability)	Creative Problem Solvers (believability)
Shape the Future (believability)	Shape the Future (believability)	Shape the Future (appealing/ believability)
	Community (appealing)	
	Stick with it (appealing)	

“World of Difference” is both appealing and believable among our Base Targets, “Shape the Future” among Movers

All Students	Gender by Race						Identify with a disability	Targets	
	Male White Students	Female White Students	Male Black Students	Female Black Students	Male Hispanic Students	Female Hispanic Students		Base	Movers
Everyone (appealing)	Everyone (appealing)	Everyone (appealing)	Everyone (appealing)	Everyone (appealing)	Everyone (appealing)	Everyone (appealing)	Everyone (appealing)		Everyone (appealing)
Pay (appealing)	Pay (appealing)	Pay (appealing)	Pay (appealing)		Pay (appealing)		Pay (appealing)	Pay (appealing)	Pay (appealing)
World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (believability)	World of Difference (appealing)	World of Difference (believability)	World of Difference (appealing/ believability)		World of Difference (believability)	World of Difference (appealing/ believability)	World of Difference (believability)
		Real World (appealing)							
			Creative (believability)	Creative (appealing/ believability)		Creative (appealing)			
Creative Problem Solvers (believability)	Creative Problem Solvers (believability)	Creative Problem Solvers (believability)	Creative Problem Solvers (believability)	Creative Problem Solvers (appealing)		Creative Problem Solvers (believability)	Creative Problem Solvers (believability)	Creative Problem Solvers (believability)	Creative Problem Solvers (believability)
Shape the Future (believability)	Shape the Future (believability)	Shape the Future (believability)			Shape the Future (appealing/ believability)	Shape the Future (appealing/ believability)	Shape the Future (believability)	Shape the Future (believability)	Shape the Future (appealing/ believability)
			Health, Happiness, and Safety (believability)				Health, Happiness, and Safety (appealing)		
				Community (believability)				Community (appealing)	
								Stick with it (appealing)	
					Team Players (believability)	Team Players (believability)			

Parents find “World of Difference” to be both appealing and believable across demographic groups

All Parents	Parent of...		Parent Education		Parent Race		Child with a disability	Targets	
	Male Child	Female Child	Non-college	College+	White	POC		Base	Movers
World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)	World of Difference (appealing/ believability)
Pay (appealing)	Pay (appealing)	Pay (appealing)	Pay (appealing)	Pay (appealing)	Pay (appealing)	Pay (appealing)	Pay (appealing/ believability)	Pay (appealing)	Pay (appealing)
Shape the Future (appealing)			Shape the Future (appealing)						Shape the Future (appealing/ believability)
Future (believability)	Future (appealing/ believability)		Future (believability)	Future (believability)		Future (believability)		Future (believability)	
		Real World (appealing)							
			Everyone (appealing)						
				Health, Happiness, and Safety (appealing)		Health, Happiness, and Safety (appealing)		Health, Happiness, and Safety (appealing)	
				Community (appealing)					Community (believability)
Creative Problem Solver (believability)	Creative Problem Solver (believability)	Creative Problem Solver (believability)	Creative Problem Solver (believability)	Creative Problem Solver (believability)	Creative Problem Solver (believability)	Creative Problem Solver (believability)	Creative Problem Solver (appealing)	Creative Problem Solver (believability)	
					Paths (appealing)		Paths (believability)		
					Creative (believability)				Team Players (believability)

“Everyone” is very appealing to students, but parents prefer “World of Difference”

Next you will read some statements that people have made about engineering…*very appealing*

	Everyone	Pay	World of Differ-ence	Shape the Future	Health, Happ-iness, Safety	Real World	Creative	Creative – Problem Solver	Future	Paths	Com-munity	Stick With It	Team Players	Climate
All Students	40	39	36	35	34	32	32	31	31	31	31	31	29	28
White Male	44	44	39	38	34	29	34	36	37	35	34	32	32	29
White Female	34	33	29	28	32	34	28	24	25	27	27	28	25	26
Black Male	45	44	44	36	37	39	37	41	37	35	40	43	35	34
Black Female	36	35	34	32	32	30	36	36	30	33	32	30	27	33
Hispanic Male	45	45	43	43	36	35	31	31	34	29	33	35	31	30
Hispanic Female	35	32	33	35	29	28	37	26	30	29	23	26	26	23
Identify with a disability	45	31	34	35	37	32	34	27	32	33	35	32	32	25
Targets: Base	68	73	76	69	71	66	69	61	68	66	74	73	62	61
Targets: Movers	55	51	45	47	43	41	39	39	38	41	38	41	37	34
All Parents	46	52	53	47	46	43	42	46	45	45	42	37	43	34
Male Child	47	53	53	50	48	39	37	49	51	47	44	34	47	35
Female Child	45	50	53	43	45	48	47	44	40	44	41	41	39	34
Non-College	47	49	52	47	43	43	43	45	43	43	38	36	43	34
College +	42	57	53	46	52	42	40	49	49	50	52	40	42	35
White	40	45	48	40	39	41	38	42	40	43	34	32	38	31
POC	54	58	59	54	56	46	49	50	51	49	54	43	50	39
Child with a disability	26	52	50	36	35	33	27	39	21	29	30	20	32	18
Targets: Base	61	68	75	63	69	59	61	65	65	67	65	49	57	46
Targets: Movers	51	58	57	56	50	50	42	53	49	44	39	39	51	42

“Shape the Future” and “World of Difference” are the most believable messages for students; “Everyone” is less believable

Next you will read some statements that people have made about engineering…*very believable*

	Everyone	Pay	World of Differ-ence	Shape the Future	Health, Happ-iness, Safety	Real World	Creative	Creative – Problem Solver	Future	Paths	Com-munity	Stick With It	Team Players	Climate
All Students	28	42	53	54	45	45	46	51	43	43	44	38	45	41
White Male	27	44	53	55	44	47	47	52	47	43	47	41	46	41
White Female	26	40	51	57	47	42	43	52	44	46	42	36	40	42
Black Male	51	53	57	59	64	48	61	64	48	56	57	47	50	58
Black Female	32	47	58	49	55	46	56	50	45	42	56	45	50	46
Hispanic Male	27	49	52	52	30	42	44	46	33	40	43	41	50	36
Hispanic Female	28	33	48	50	41	41	46	50	46	38	38	38	51	37
Identify with a disability	29	38	59	61	43	51	48	54	42	50	48	36	45	46
Targets: Base	49	70	77	82	68	65	74	77	72	68	75	60	68	68
Targets: Movers	30	49	59	58	51	54	50	58	50	52	51	45	54	47
All Parents	28	47	62	53	49	52	54	59	56	51	53	43	51	50
Male Child	30	54	65	59	48	54	57	64	63	55	55	47	56	53
Female Child	26	39	59	46	50	50	50	53	48	47	50	38	44	46
Non-College	28	44	61	52	48	51	52	56	54	51	51	40	48	49
College +	29	53	64	55	50	56	59	67	61	52	58	49	57	52
White	21	44	59	48	44	50	52	58	49	46	47	36	44	43
POC	37	50	66	59	55	53	56	60	67	56	59	52	60	59
Child with a disability	16	54	51	34	45	36	28	34	29	47	40	22	43	35
Targets: Base	39	63	80	67	61	66	71	78	74	65	67	55	61	64
Targets: Movers	25	43	58	47	44	45	34	45	46	42	47	39	48	44

Students continue to find “world of difference” and “shape the future” to be the top appealing messages

Next you will read some statements that people have made about engineering.

How appealing is this statement…? top appealing messages

All Students

2006	2022
Engineers make a world of difference…	**Engineers make a world of difference…**
Engineers are creative problem solvers…	Engineers are creative problem solvers…
Engineers help shape the future…	**Engineers help shape the future…**
Engineering is essential to our health, happiness, and safety…	**Engineering is essential to our health, happiness, and safety…**
Engineers connect science to the real world…	Engineers connect science to the real world…

Male Students

2006	2022
Engineers make a world of difference…	**Engineers make a world of difference…**
Engineers are creative problem solvers…	Engineers are creative problem solvers…
Engineers help shape the future…	**Engineers help shape the future…**
Engineering is essential to our health, happiness, and safety…	**Engineering is essential to our health, happiness, and safety…**
Engineers connect science to the real world…	Engineers connect science to the real world…

Female Students

2006	2022
Engineers make a world of difference…	**Engineers make a world of difference…**
Engineers are creative problem solvers…	Engineers are creative problem solvers…
Engineers help shape the future…	Engineers help shape the future…
Engineering is essential to our health, happiness, and safety…	**Engineering is essential to our health, happiness, and safety…**
Engineers connect science to the real world…	**Engineers connect science to the real world…**

Students continue to find “world of difference” and “creative problem solvers” to be the top believable messages

Next you will read some statements that people have made about engineering.

How believable is this statement…? top believable message

All Students

2006	2022
Engineers make a world of difference…	**Engineers make a world of difference…**
Engineers are creative problem solvers…	**Engineers are creative problem solvers…**
Engineers help shape the future…	**Engineers help shape the future…**
Engineering is essential to our health, happiness, and safety…	Engineering is essential to our health, happiness, and safety…
Engineers connect science to the real world…	Engineers connect science to the real world…

Male Students

2006	2022
Engineers make a world of difference…	**Engineers make a world of difference…**
Engineers are creative problem solvers…	**Engineers are creative problem solvers…**
Engineers help shape the future…	**Engineers help shape the future…**
Engineering is essential to our health, happiness, and safety…	Engineering is essential to our health, happiness, and safety…
Engineers connect science to the real world…	Engineers connect science to the real world…

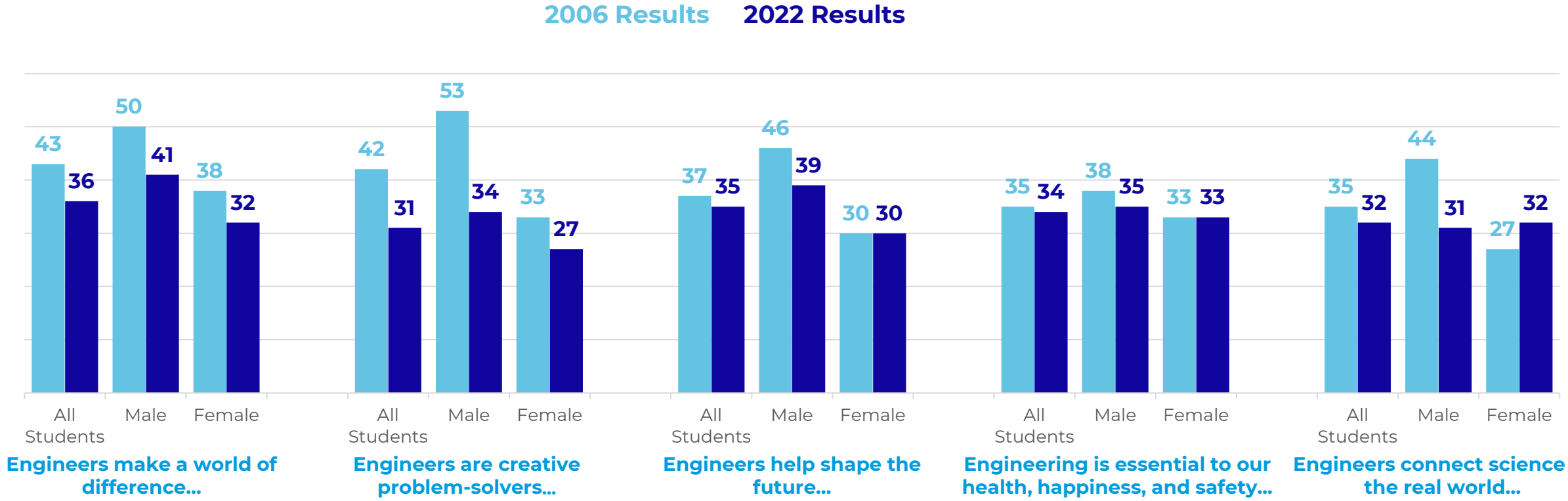
Female Students

2006	2022
Engineers make a world of difference…	**Engineers make a world of difference…**
Engineers are creative problem solvers…	**Engineers are creative problem solvers…**
Engineers help shape the future…	**Engineers help shape the future…**
Engineering is essential to our health, happiness, and safety…	Engineering is essential to our health, happiness, and safety…
Engineers connect science to the real world…	Engineers connect science to the real world…

Overall students find the updated statements to be less or similarly appealing now than in 2006

Next you will read some statements that people have made about engineering.

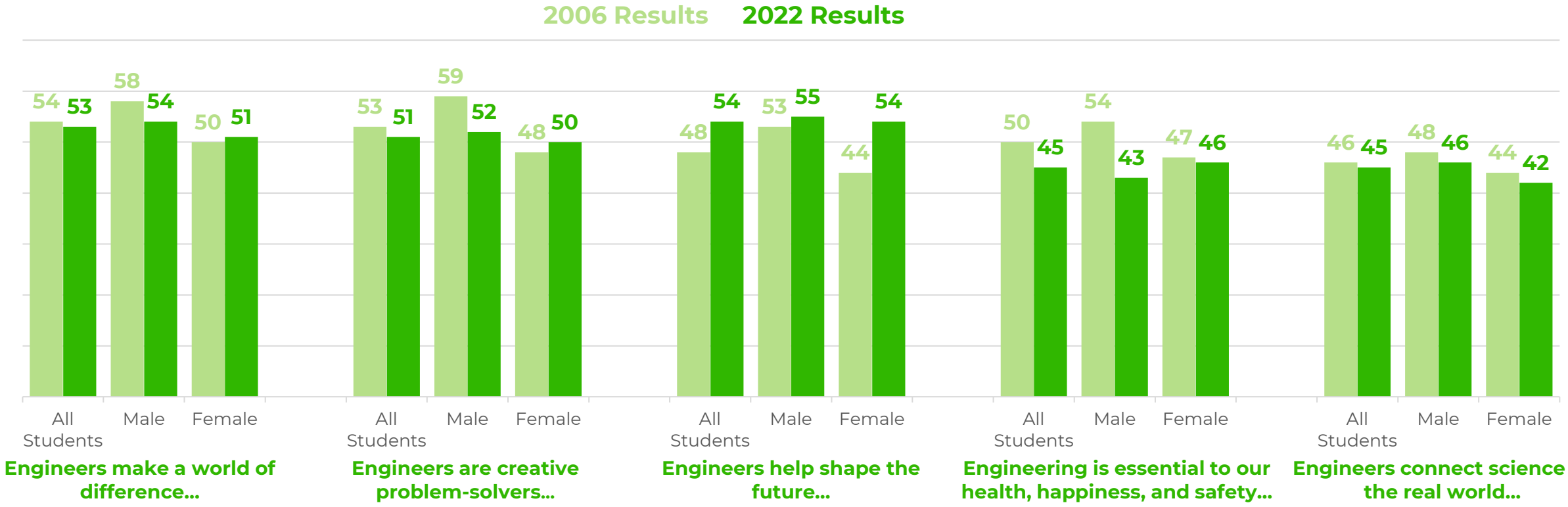
How appealing is this statement...? % very appealing



Students find statements to be less believable than in 2006, except for “engineers help shape the future”

Next you will read some statements that people have made about engineering.

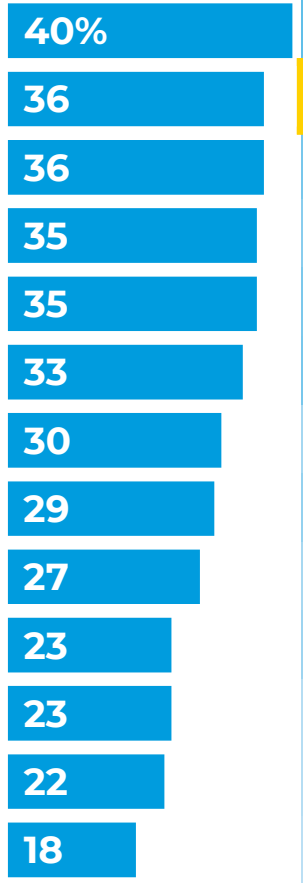
How believable is this statement...? % very believable



Profiles of Engineers and Technicians

Bios of video game developers are rated as the top two most appealing bios

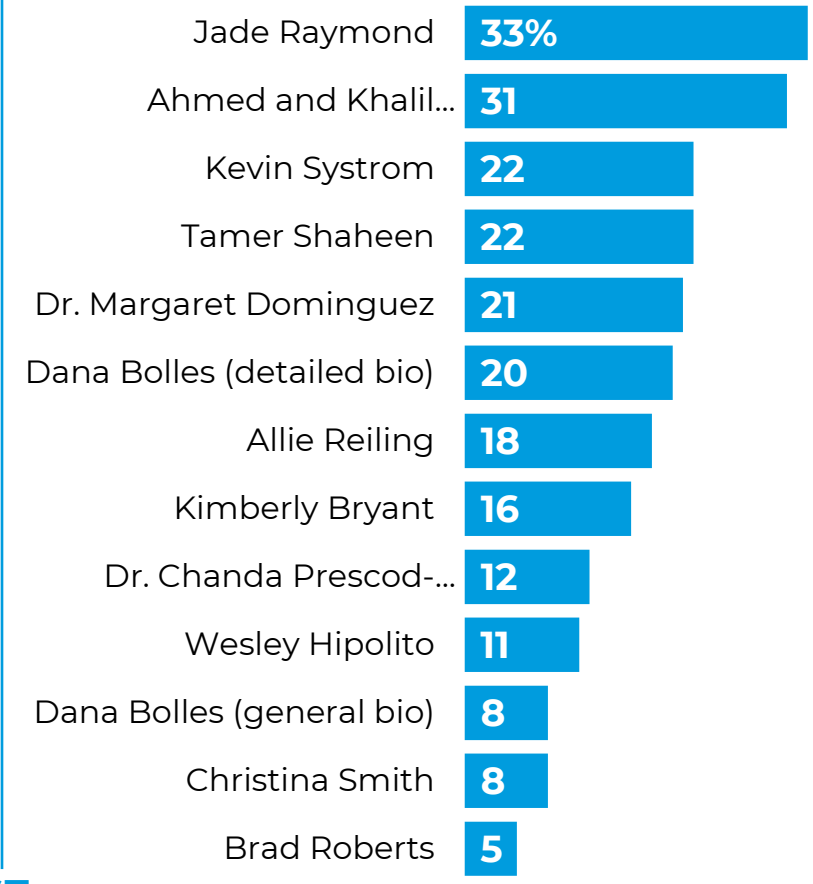
You will now read several short bios of engineers. Please indicate how appealing each bio is to you.



	Male	Female	Male/ White	Female/ White	Male/ Black	Female/ Black	Male/ Hispanic	Female/ Hispanic	Male/ Asian	Female/ Asian	Identify as Disabled	Base	Mover	Mover Male	Mover Female
Jade Raymond	47	33	49	29	51	37	40	36	41	47	46	63	54	61	47
Ahmed and Khalil Abdullah	48	23	43	21	67	37	51	19	42	23	43	61	43	58	28
Dr. Margaret Dominguez	40	32	40	30	43	34	39	34	39	35	37	75	43	42	45
Dana Bolles (personal bio)	35	35	34	36	42	41	39	32	24	32	37	67	46	45	46
Kevin Systrom	39	31	38	27	47	38	34	36	40	37	32	63	43	43	44
Tamer Shaheen	40	27	40	25	45	35	39	27	35	19	33	67	38	43	33
Kimberly Bryant	27	33	21	26	54	52	29	32	11	41	34	56	40	36	43
Dana Bolles (work bio)	32	26	32	25	36	20	36	27	22	31	30	59	39	38	40
Allie Reiling	26	29	24	26	33	36	26	32	24	31	30	51	36	30	43
Wesley Hipolito	29	18	28	17	41	26	30	18	17	16	26	56	27	30	26
Dr. Chanda Prescod-...	22	24	22	21	31	32	23	25	14	21	26	49	30	25	35
Christina Smith	22	21	22	21	31	29	22	20	11	11	24	49	26	23	28
Brad Roberts	20	16	19	16	27	17	22	16	10	16	19	44	22	20	24

Video game developers drive up interest in engineering among students

Of the twelve bios that you just read, which two bios, if any, makes you feel most interested in the field of engineering?



	Male	Female	Male/ White	Female/ White	Male/ Black	Female/ Black	Male/ Hispanic	Female/ Hispanic	Identify with a disability	Base	Mover	Mover Male	Mover Female
Jade Raymond	36	29	38	29	30	23	35	32	37	29	40	45	34
Ahmed and Khalil...	45	16	41	12	65	32	46	15	38	30	33	49	17
Kevin Systrom	25	19	26	18	21	26	25	21	17	23	23	27	20
Tamer Shaheen	28	15	28	15	29	12	26	18	20	23	22	30	15
Dr. Margaret Dominguez	20	23	21	27	14	15	20	17	18	36	22	19	25
Dana Bolles (detailed bio)	17	23	16	24	13	18	20	26	20	21	21	17	25
Allie Reiling	11	25	12	24	10	18	10	31	18	14	20	11	29
Kimberly Bryant	7	24	4	14	19	53	6	24	15	13	19	9	28
Dr. Chanda Prescod-...	9	14	9	14	8	16	11	15	15	12	13	10	17
Wesley Hipolito	16	7	14	5	15	7	19	11	12	18	11	14	8
Dana Bolles (general bio)	8	9	8	9	14	5	6	8	5	6	10	11	11
Christina Smith	7	9	7	10	7	8	9	7	10	11	8	7	9
Brad Roberts	7	4	7	5	8	3	6	3	5	9	6	6	6

Bios of video game developers are rated as the top two most appealing bios

You will now read several short bios of engineers…
bios ranked by 'very appealing' overall

Why did the bio of [ENGINEER] make you more interested in the field of engineering?

#1 Jade Raymond

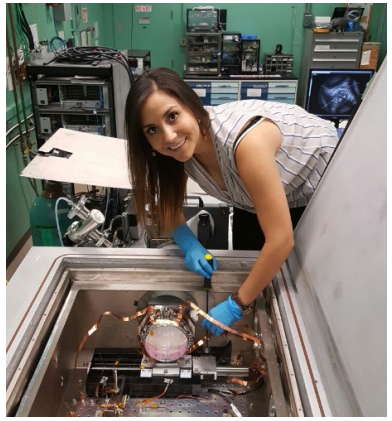
Jade Raymond is a **video game designer and computer engineer** known for her work on The Sims Online and for leading the team that developed Assassin's Creed. She is the CEO of Stadia Games and Entertainment, and the founder of Ubisoft Toronto, and Motive Studios.

#2 Ahmed and Khalil Abdullah

Ahmed and Khalil Abdullah are brothers and **video game designers** who founded multi-aware winning game company Decoy Games after both studying computer science at UMass Amherst. Using their combined computer science knowledge, and online tutorials about video game development, they created their first video game *Swimsanity!*.

Bios of NASA engineers are appealing, and their at-work images make students feel most interested in engineering

You will now read several short bios of engineers…
bios ranked by 'very appealing' overall



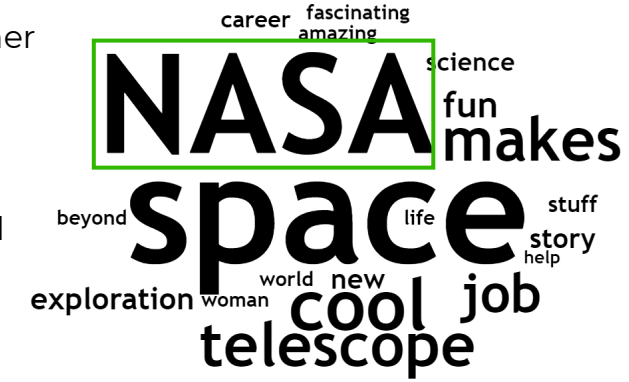
#3 Dr. Margaret Dominguez

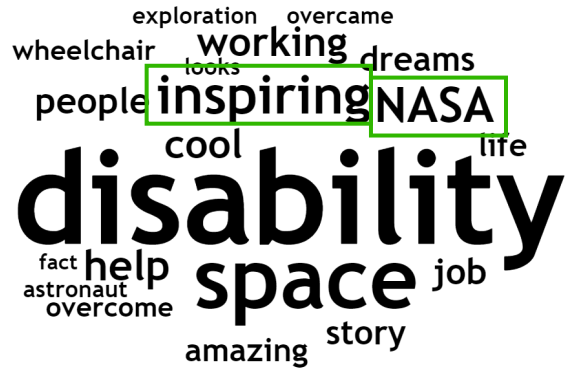
Dr. Margaret Dominguez is an optical engineer at the NASA Goddard Space Flight Center. At NASA her work has contributed to the new James Webb Space Telescope, the largest optical telescope in space. She is also working on the Roman Space Telescope in development at NASA, designed to document planets outside of our solar system, and offer insights into how dark energy shapes our universe.

#4 Dana Bolles

Dana Bolles dreamed of becoming an astronaut where she could work in an environment without her wheelchair. She pursued a career in mechanical engineering and earned a master's degree in Rehabilitation Engineering and Technology. She works at NASA, and over the course of her career, has built an internal website on the Exploration of Life beyond Earth and led a team of astrobiologists to develop a tool to help NASA better prepare the public for an eventual announcement of finding life.

Why did the bio of [ENGINEER] make you more interested in the field of engineering?





An alternative bio of Dana Bolles and alternative image that does not mention her disability is less appealing to students.

While less appealing overall, Wesley and Brad's bios appeal to some students for their struggles with math and physics

You will now read several short bios of engineers…

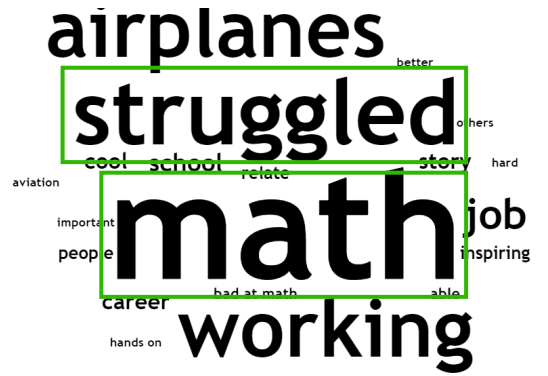
Wesley Hipolito

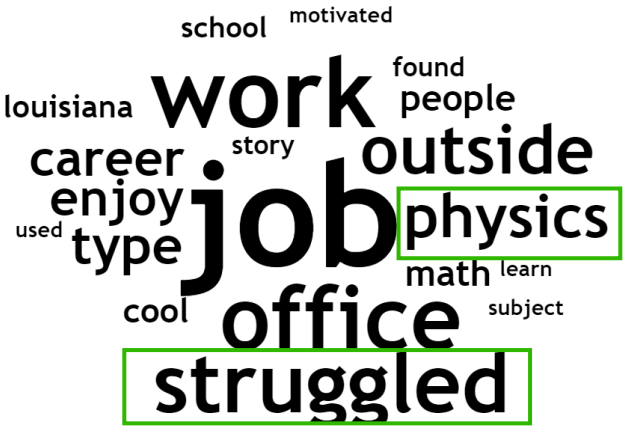
Wesley Hipolito **struggled with math in high school**, but after taking a machining class at Asnuntuk Community College, studied machining technology and began working at Flanagan Industries where he is an integral member of a team making components of airplanes.

Brad Roberts

Brad Roberts is a land surveyor, specializing in defining property boundaries in Louisiana. **Despite struggling with physics courses as a student**, he uses physics in his job, working both in an office and out in the field with clients to help shape and define building projects. He is a volunteer with the National Council of Examiners for Engineering and Surveying (NCEES).

Why did the bio of [ENGINEER] make you more interested in the field of engineering?





Jade Raymond is a video game designer and computer engineer known for her work on The Sims Online and for leading the team that developed Assassin's Creed. She is the CEO of Stadia Games and Entertainment, and the founder of Ubisoft Toronto, and Motive Studios.

"**Her job includes video games which I love**, and she's created a couple games that I love. **She's also a woman** so I thought that was cool and her experience was good too."
– Female, Asian, age 15

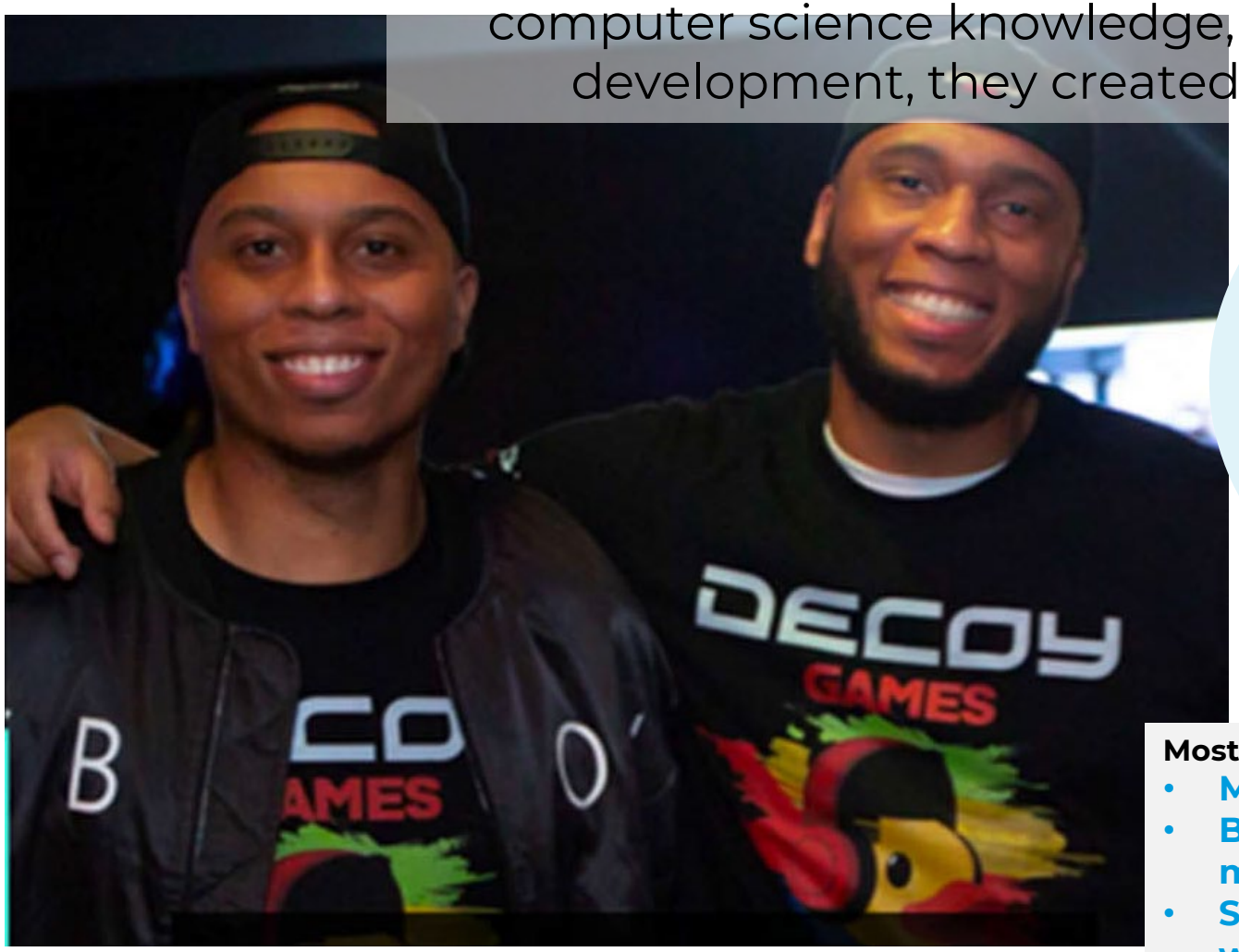
"**Her job would be so much fun**, designing video games though I know it's hard would allow you to be **creative** and have fun with it."
– Female, White, age 16

"**Because I am physically handicapped**, the idea of designing video games is appealing because it **wouldn't be such a physical job**."
– Male, White, age 14, identify with a disability

Most interesting to:

- **Mover target group**
- **Students who identify with a disability**

Ahmed and Khalil Abdullah are brothers and video game designers who founded multi-aware winning game company Decoy Games after both studying computer science at UMass Amherst. Using their combined computer science knowledge, and online tutorials about video game development, they created their first video game *Swimsanity!*.



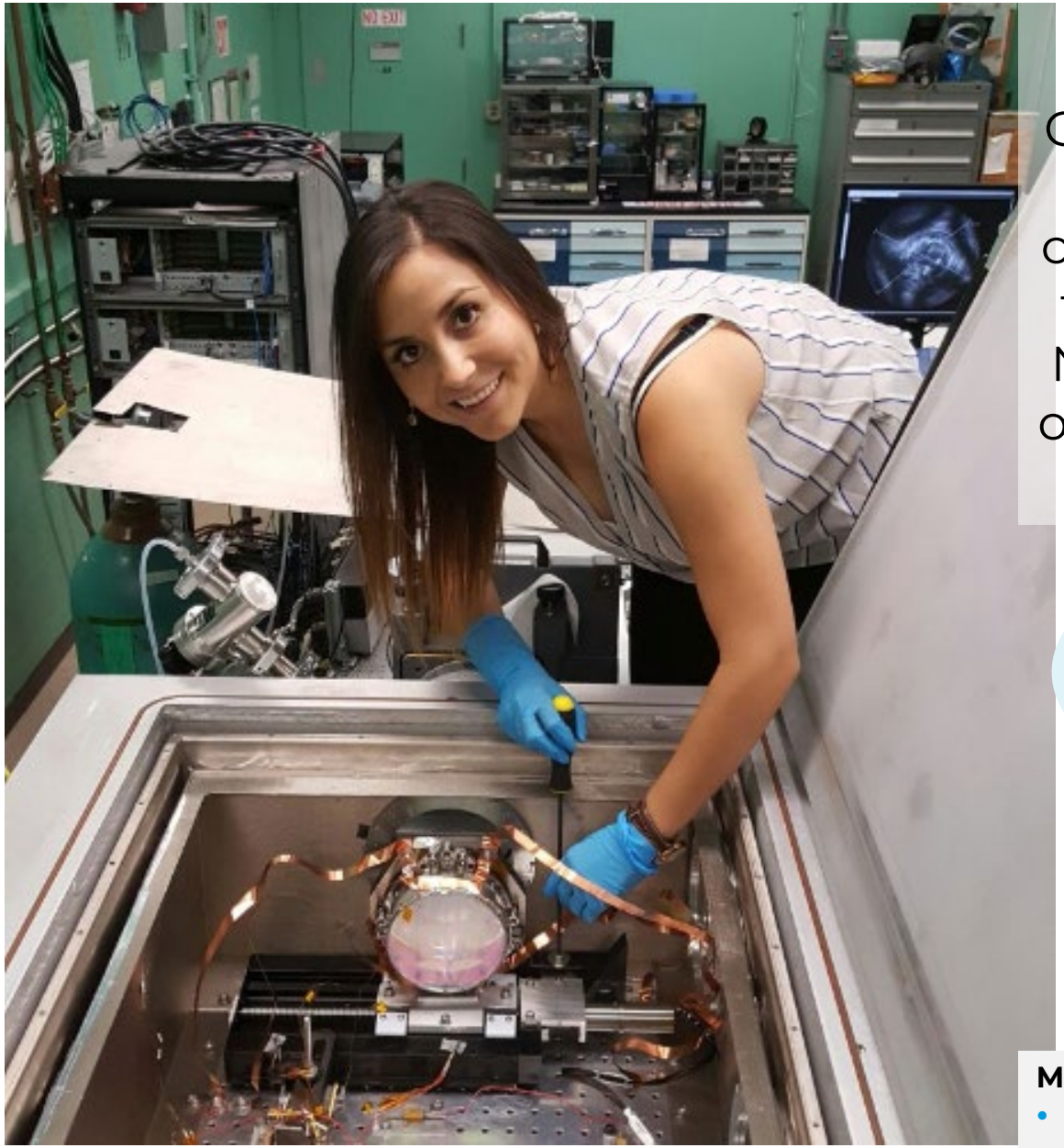
"Because **I have a brother** and we are really close and we **love playing video games** and **we wish we could create our own someday**."
– Male, Black, age 15

"I enjoy video gaming and didn't **realize that engineering was behind it**."
– Male, Hispanic, age 17

"They **look like me and people in my community** and I love the gaming part as I love gaming with my friends."
- Male, Black, age 15, identify with a disability

Most interesting to:

- **Male students**
- **Black and Hispanic male students**
- **Students who identify with a disability**



Dr. Margaret Dominguez is an optical engineer at the NASA Goddard Space Flight Center. At NASA her work has contributed to the new James Webb Space Telescope, the largest optical telescope in space. She is also working on the Roman Space Telescope in development at NASA, designed to document planets outside of our solar system, and offer insights into how dark energy shapes our universe.

"**How cool would it be to work on something so awesome**. Space is so interesting and fascinating."
– Female, White, age 15

"I **would love to work for NASA**. When it comes to work that makes a difference it doesn't get much better than NASA."
– Male, White, age 15

"I think **her work is the most interesting**. Especially her work on the James Webb Telescope. I love space and I'm pumped about the pictures we're seeing with our new technology. **I'd love to work on stuff like that**."
- Female, White, age 15

Most interesting to:

- **Base target students**
- **White female students**

Dana Bolles dreamed of becoming an astronaut where she could work in an environment without her wheelchair. She pursued a career in mechanical engineering and earned a master's degree in Rehabilitation Engineering and Technology. She works at NASA, and over the course of her career, has built an internal website on the Exploration of Life beyond Earth and led a team of astrobiologists to develop a tool to help NASA better prepare the public for an eventual announcement of finding life.

Most interesting to:
- **Base target students**
- **Mover target students**
- **Female/Mover students**

"Her story is so amazing, she **didn't let anything stop her from finding a job she loves** and is amazing at."
– Female, Hispanic, age 18

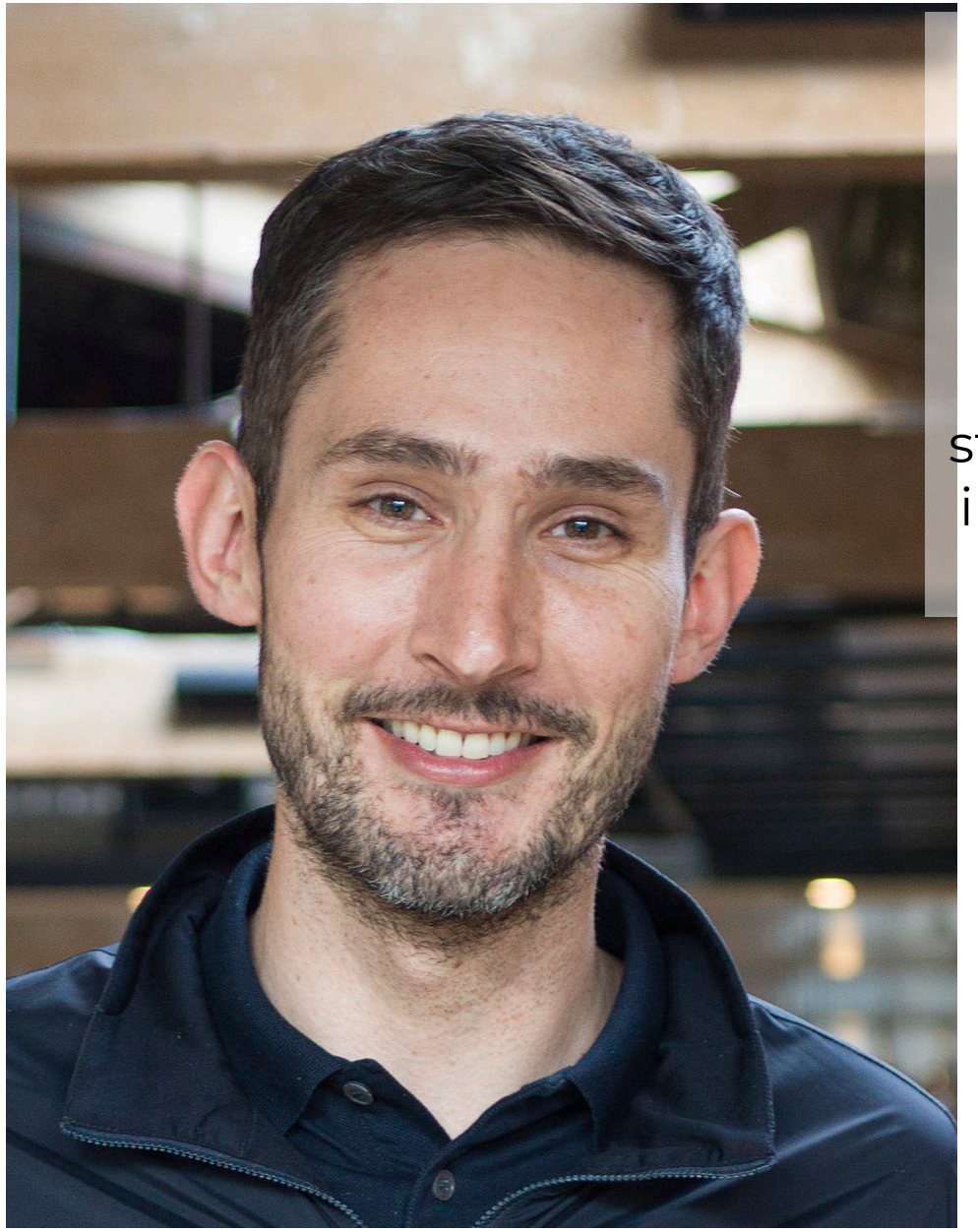
"She is **very inspiring**. She has a disability and still was able to fulfill her dreams and work at the most amazing job on the planet, at NASA. **That's more than awesome! She has definitely inspired me to look into engineering for a possible career**."
- Male, Black, age 15

"I like the thought of **finding life on other planets** and perhaps colonizing planets in our solar system."
– Male, White, age 17

Most interesting to:
- **Mover target students**
- **Female students**

"I like the idea of being an **engineer at NASA** and working on eventually contacting life other than ourselves."
– Female, White, age 17

Dana Bolles is a mechanical engineer with a master's degree in Rehabilitation Engineering and Technology and works at NASA. Over the course of her career, she has built an internal website on the Exploration of Life beyond Earth and led a team of astrobiologists to develop a tool to help NASA better prepare the public for an eventual announcement of finding life.



Kevin Systrom is an American computer programmer and the co-founder and former CEO of Instagram. A graduate of Stanford University with a bachelor's degree in management science and engineering, Systrom developed an interest in photography, spending a semester in Florence, Italy studying photography and later co-founding Instagram in 2010. He was included in the list of America's Richest Entrepreneurs Under 40 in 2016.

"**He is the founder of Instagram!** I never thought he just had the idea after some photography classes. That sounds like a very **creative** job and very successful."
– Male, Black, age 15

"I think because Instagram is so successful and well known it caught my attention more. It **showed me a different side of engineering** too."
– Male, Hispanic, age 14

Most interesting to:

- **Students who use Instagram every day**

Tamer Shaheen is a YouTuber and TikTok influencer and a mechanical engineering who shares his insights into the field of mechanical engineering, how to be a successful student, and how to get a job as a mechanical engineer. He has worked for Tesla and Serve Robotics as a mechanical design engineer.

"**I am always on social media sites** and it's exciting to see someone with a strong presence who is also an engineer."
– Male, Hispanic, age 15

"Because he **does things I can relate to (TikTok/YouTube)** so I feel more confident and **open to exploring this field**."
– Female, White, age 16

"**I like that he teaches people** how to get into the field of mechanical engineering on TikTok because it is **easily accessible** and he is also **young**, so that could make others curious to watch his videos."
– Male, Black, age 16

Most interesting to:
- **Male students**
- **Base target group**
- **Male/Mover target group**

Kimberly Bryant is an African American electrical engineer who has worked in both the electrical engineering and biotechnology fields, including at pharmaceutical companies Pfizer, Merck, Genentech, and Novartis. In 2011, after struggling to find an after-school course in computer programming for her daughter, she founded the non-profit company Black Girls Code, teaching computer programming and encouraging involvement in STEM for young girls of color in after-school and summer programs.

"I liked the story of **someone who looks like me**, makes me feel I can do the same thing."
– Female, Black, age 14

"It truly just is encouraging to see a fellow woman of color in the STEM field. **Seeing this pushes me to continue in the field as well**."
– Female, Black, age 17

Most interesting to:

- **Black students**
- **Female Black students**

Allie Reiling is a water engineer, working for Caminos de Agua, a non-profit organization that works with local communities in Mexico to monitor local water quality and apply current technologies and invent new technologies to address water quality and scarcity problems.

"I love how the work she does is **directly helping communities and families** have access to safe and clean water."
- Female, Asian, age 18

"I thought her career was **meaningful and had a purpose** of **making a difference** by working towards solving the water scarcity issue."
– Female, Hispanic, age 15

"She is doing amazing work for a country that needs it. **My family is Mexican and I would have loved to make a differencee in their country if I had an engineering background**."
– Female, Hispanic, age 18

Most interesting to:
- **Female Hispanic students**
- **Female/Mover students**

Wesley Hipolito struggled with math in high school, but after taking a machining class at Asnuntuk Community College, studied machining technology and began working at Flanagan Industries where he is an integral member of a team making components of airplanes.

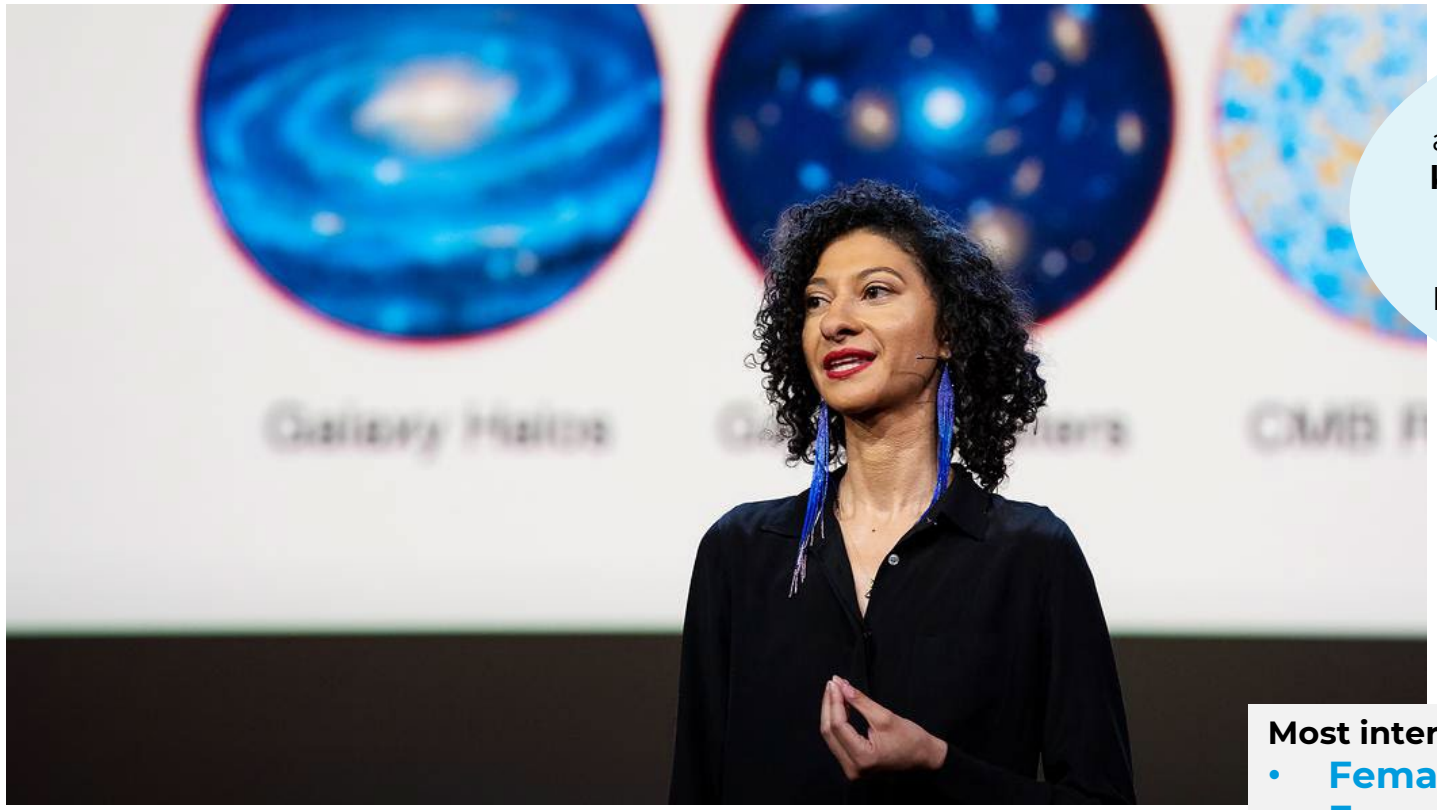
"He is capable of working in the field of engineering even though he originally wasn't doing the best in math. In high school **I struggled in calculus**, so **seeing this guy becoming an engineer and push through his struggles in math is inspiring**."
– Female, Asian, age 18

"**Because he was able to get a career regardless of struggling in math, which is what I struggle in**. He designs aircraft, which carries lots of people every day."
– Male, Hispanic, age 15

Most interesting to:

- **Male Black students**
- **Male Hispanic students**
- **Base target group**

Dr. Chanda Prescod-Weinstein is both an Assistant Professor of Physics and Core Faculty Member in Women's and Gender Studies at the University of New Hampshire. She is also a monthly columnist at New Scientist, and author of The Disordered Cosmos: A Journey into Dark Matter, Spacetime, and Dreams Deferred, a popular science book on particle physics and cosmology.



"**Engineering** is a field that had always been **shown to me as some kind of 'traditional' and 'boys only' field** so to see someone in the field that is **not only a woman but a political activist** is inspiring to me."
– Female, White, age 18

"It's the exact field I want to be in. I **was and still am very curious about the solar system and how it works**."
- Female, Black, age 15

Most interesting to:

- **Female Black students**
- **Female/Mover target group**

After getting laid off, **Christina Smith** changed careers, graduating from the College of the Mainland in the Process Technology program, all while raising her young daughter. After interning for Shell, she was hired as an full-time employee out of her internship.

"**She seems to actually enjoy it**, and this story was more interesting, especially concerning **changing college classes to pursue and entirely different career path**."
– Female, White, age 17

"Knowing that she had a different job and changed to the field of engineering made me **wonder if I might enjoy it if I gave it a chance**."
- Female, Hispanic, age 18, identify with a disability

Most interesting to:

- **Female, White students**
- **Identify with a disability**
- **Base target group**

Brad Roberts is a land surveyor, specializing in defining property boundaries in Louisiana. Despite struggling with physics courses as a student, he uses physics in his job, working both in an office and out in the field with clients to help shape and define building projects. He is a volunteer with the National Council of Examiners for Engineering and Surveying (NCEES).

"The bio sounded like it was **more than sitting at a desk doing math**."
– Male, White, age 16

"Being from Louisiana I find it very interesting when it was mentioned and it **makes me think if he could do this then so could I**."
– Male, Black, age 17

"I chose not to take Physics as a class in my senior year because I suck at it. **Part of why I don't want to do much with the sciences is that I'm not very good at physics at all.** His being able to do cool stuff in engineering despite not being good at physics in high school **makes me feel more reassured**."
– Female, Hispanic, age 17

Most interesting to:

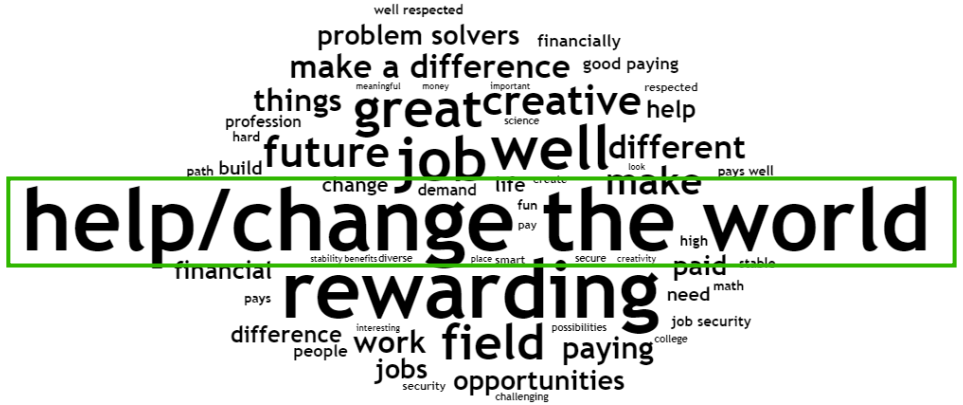
- **Male, Black students**
- **Base target group**

Student-to-student and parent-to-parent conversations about engineering focus on a global impact

All Parents

If you were to try to convince **your child** to pursue a career in engineering, what would you tell them?

If you were trying to convince **another parent** why engineering is a good career for their child to consider, if a few words, what would you tell them?



All Students

If you were trying to convince your peers to pursue a career in engineering in one sentence, what would you tell them about engineering?

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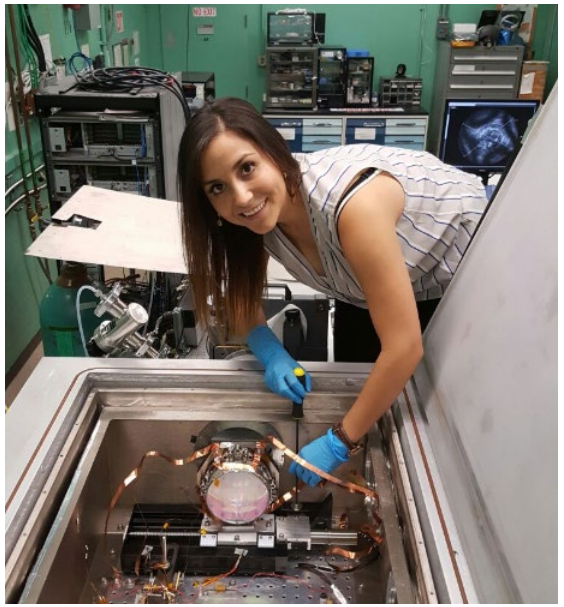
Things to Consider When Developing Targeted Messages

Targeted Communication to Girls



- **Elevate biographies of female engineers.** Using profiles and messages together is more effective than traditional messaging alone, which is harder to relate to or believe. When girls see profiles of women in engineering, they can visualize themselves in those careers and say…

"I liked the story of someone who looks like me, makes me feel I can do the same thing."

"Engineering is a field that has always been shown to me as some kind of 'traditional' and 'boys only' field so to see someone in the field that is not only a woman, but a political activist is inspiring to me."

- **Emphasize "meaningful" work** over "personally rewarding" work, though this is a narrow preference..

Targeted Communication to Boys

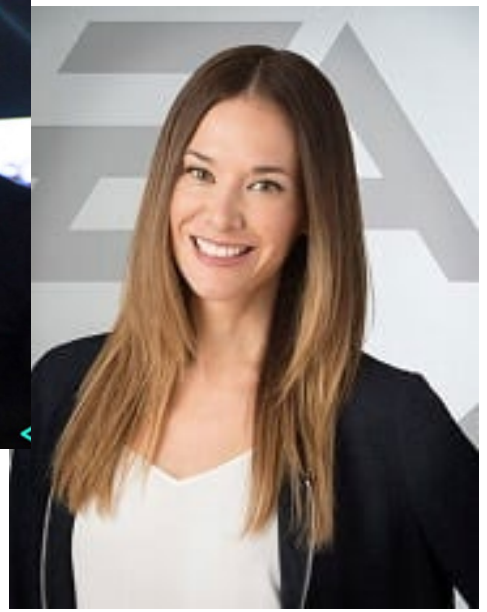
- **Educate about opportunities to work in engineering without going to college.** Boys appear to be especially responsive once informed of these alternative entry points into the field. Profiles that show individuals in careers in engineering who have taken a less traditional route break through preconceived notions of engineering:

"He was able to get a career regardless of struggling in math, which is what I struggle in."

- **Emphasize "personally rewarding" work** over "meaningful" work, though this is a narrow preference.

- **Elevate video game development as a career option,** as this appears to be particularly compelling for boys:

"I enjoy video gaming and didn't realize that engineering was behind it."



Targeted Communication to Black Boys and Girls

- **Emphasize opportunities** for meaningful work, financial security, and making a difference in the world (over making a difference in one's community).

- **Introduce profiles of Black engineers,** and where possible **match the gender** of the engineer **to the target audience.**

Black girls, in particular, are more likely to become interested in engineering as a result:

"It truly just is encouraging to see a fellow woman of color in the STEM field. Seeing this pushes me to continue in the field as well."

"They look like me and people in my community."

Targeted Communication to Hispanic Boys and Girls

- **Among boys,** note opportunities to make a **difference in the world** over their community, and reemphasize through messaging that it is a field with competitive compensation:

"[She is doing] life changing work, not just for an individual but the world as a whole."

- **Among girls, introduce bios of female engineers** and note that it is a **"creative"** field:

"I thought her career was meaningful and had a purpose of making a difference."

Targeted Communication to Students Who Identify with a Disability

- **Use messaging to strengthen profiles** to boost interest in engineering. Highlight the themes around **"pay"** and **"health, happiness, safety"**.

- In targeted communications to students with a disability, note that the message **"engineering is for everyone"** is both the **most appealing message and also the least believable.**

- Use this "for everyone" language only if you are able to back it up with believable evidence that it is true for this target group.

Health, happiness, safety

Engineering is essential to our health, happiness, and safety. From growing organs for transplants to ensuring that communities have access to clean water, it is impossible to imagine life without engineering.

Pay

Engineering is a well-paid and prestigious field that sets students up for success. Engineering is in high demand with companies these days because they value people who can build new things. Even though it's becoming harder to afford the cost of living in America, studying engineering gives you financial freedom.

Targeted Communication to Asian Boys and Girls

- **Boys are particularly receptive to profiles of software engineers, video game developers, and computer programmers.** The “world of difference” and “pay” messages appealed to this group.

- **Among girls, highlight profiles of female engineers to boost interest in engineering.** Profiles of female engineers working in varying engineering roles appealed the most to this group, and the “multiple career paths” and “engineering is for everyone” messages resonated best with girls.

Targeted Communication to Native American Boys and Girls

- Among Native American students, we have a smaller sample size, but these students are similarly **interested in profiles that allow them to imagine themselves as engineers** doing interesting things.

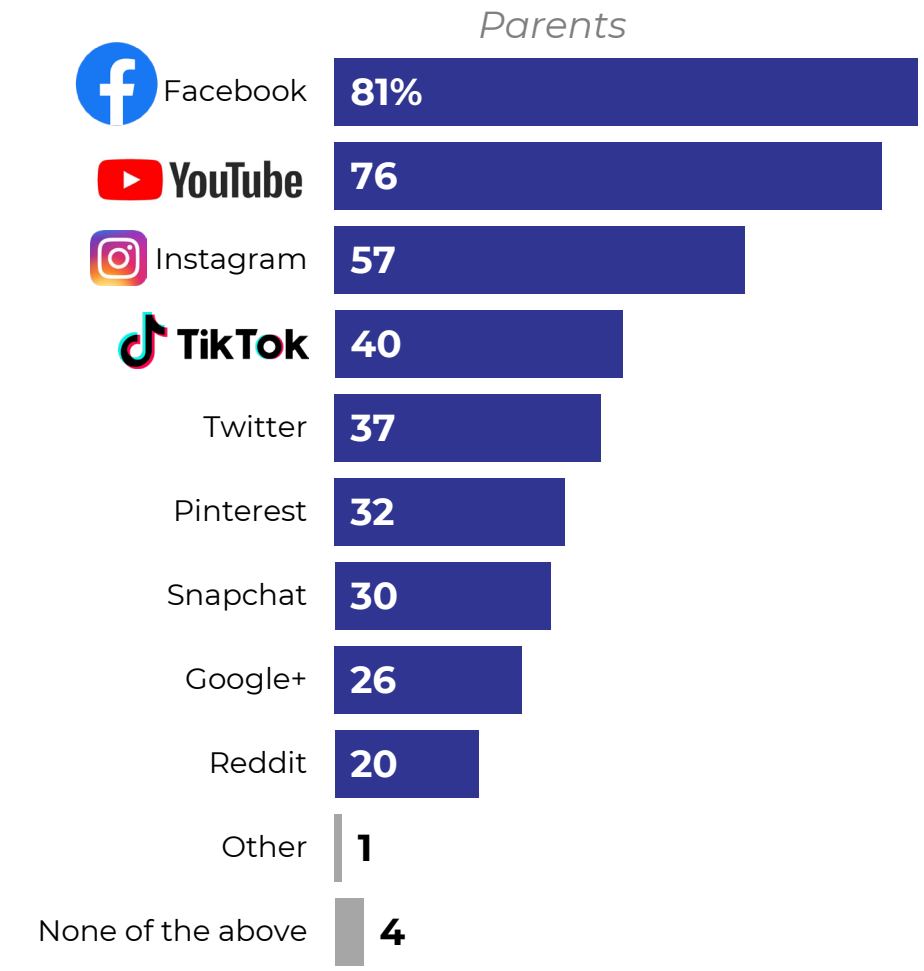
In their own words:

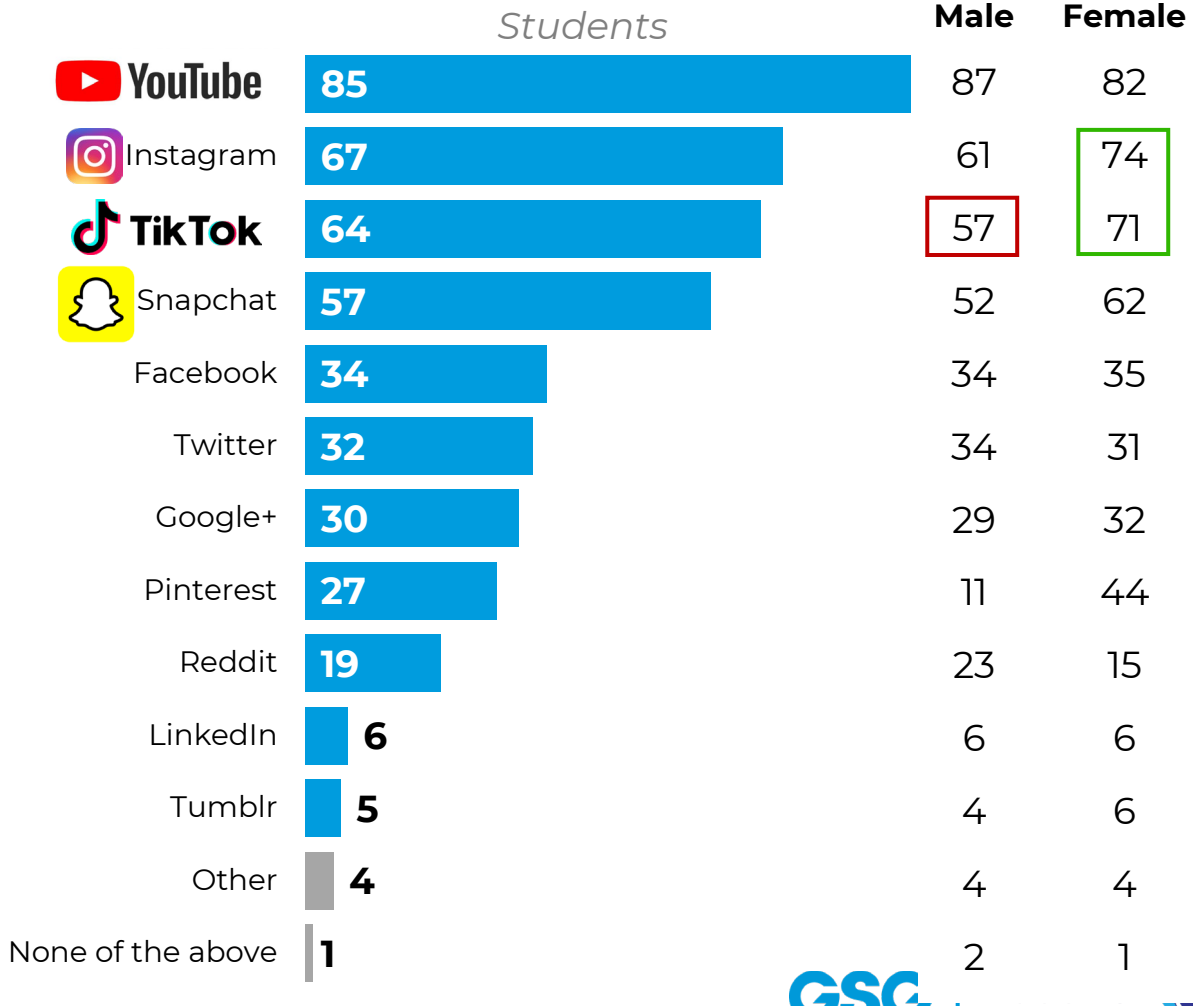
"If Dana Bolles can do it pretty much anyone could! She gives me a lot of hope and is inspirational!"

"Jade Raymond works on games I really enjoyed as a kid and is probably making more.

Communication with students and parents should be tailored to their differing social media preferences

Which of the following websites or apps do you use regularly?





For More Information about Messages Matter:

DiscoverE.org/Messages-Matter