



# **International Review of Discovery Grants Program Researcher Survey**

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**October 27, 2007**



# Outline

- **Methodology**
- **Profile of Researchers**
- **Impacts of Discovery Grant (DG) Program**
- **Distribution of DG Program Funding and Grant Levels**



# Methodology

- Overview
  - Online survey of both DG holders and unsuccessful applicants
  - Survey was conducted between July and October 2007
  - Approximate completion time of 20-25 minutes
- Questionnaire Design
  - Developed by NSERC
  - 36 questions (mostly closed); linked to temporary database with DG data
  - Enables comparisons with Researcher Grant survey conducted in 2002



# Methodology

- Survey Sampling and Administration
  - Census approach for all researchers who have held or applied for DG in last 5 years
  - E-mail invitation (with access code) and reminders
  - Administered by consultant
- DG Holders (Funded Researchers):
  - Population (N=10,416); Sample (n=4,241)
  - Margin of Error: +/- 1.2%, 19 times out of 20
- DG Applicants (Non-funded Researchers):
  - Population (N=2,191); Sample (n=258)
  - Margin of Error: +/- 5.7%, 19 times out of 20



# Methodology

- Sample is representative of both the funded and non-funded researcher populations based on seven key variables:
  - Organization Size: Large, Medium, Small
  - Organization Region: BC, Prairies, ON, QC, Atlantic
  - Gender
  - GSC Group: Physical Sciences, Mathematical Sciences, Life Science, Engineering
  - Rank: Professor, Associate, Assistant, Adjunct, Emeritus, Other
  - Grant Size: Quartiles (1Q Largest, 4Q Smallest)
  - Experience: Quartiles by Year of First Faculty Position (1Q least experience, 4Q most experience)



# Profile of Researchers: Year of First Faculty Position

Year of First Faculty Position	Funded	Non-funded
Mean	1993	1995
Median	1996	2000

Year of First Faculty Position			
Funded Researchers	Percent	Non-funded Researchers	Percent
1 <sup>st</sup> Quartile (2003-2007)	23.7	1 <sup>st</sup> Quartile (2005-2007)	21.3
2 <sup>nd</sup> Quartile (1997-2002)	25.5	2 <sup>nd</sup> Quartile (2001-2004)	24.0
3 <sup>rd</sup> Quartile (1987-1996)	25.5	3 <sup>rd</sup> Quartile (1990-2000)	28.3
4 <sup>th</sup> Quartile (1949-1986)	25.3	4 <sup>th</sup> Quartile (1949-1989)	26.4
Total	100.0		100.0



# Profile of Researchers: Average Research Funding

GSC Group	Funded		Non-funded	
	Mean	Median	Mean	Median
Physical Sciences	\$100,343	\$60,000	\$47,150	\$17,000
Mathematical Sciences	\$46,070	\$25,000	\$22,270	\$13,500
Life Sciences	\$118,129	\$80,000	\$147,559	\$55,000
Engineering	\$115,190	\$60,000	\$54,934	\$21,250
Total	\$99,542	\$55,000	\$94,729	\$30,000



# Profile of Researchers: Average Discovery Grant

GSC Group	Average Discovery Grant	Ratio of DG Funding to Overall Research Funding	
		Mean Percent	Total Percent
Physical Sciences	\$43,777	65%	43%
Mathematical Sciences	\$21,795	73%	49%
Life Sciences	\$33,735	51%	30%
Engineering	\$27,274	49%	24%
Total	\$31,856	58%	33%

- Mean Percent:  $\frac{1}{n} \sum \frac{\text{grantsize}}{\text{overallresearchfunding}}$

- Total Percent:  $\frac{\sum \text{grantsize}}{\sum \text{overallresearchfunding}}$



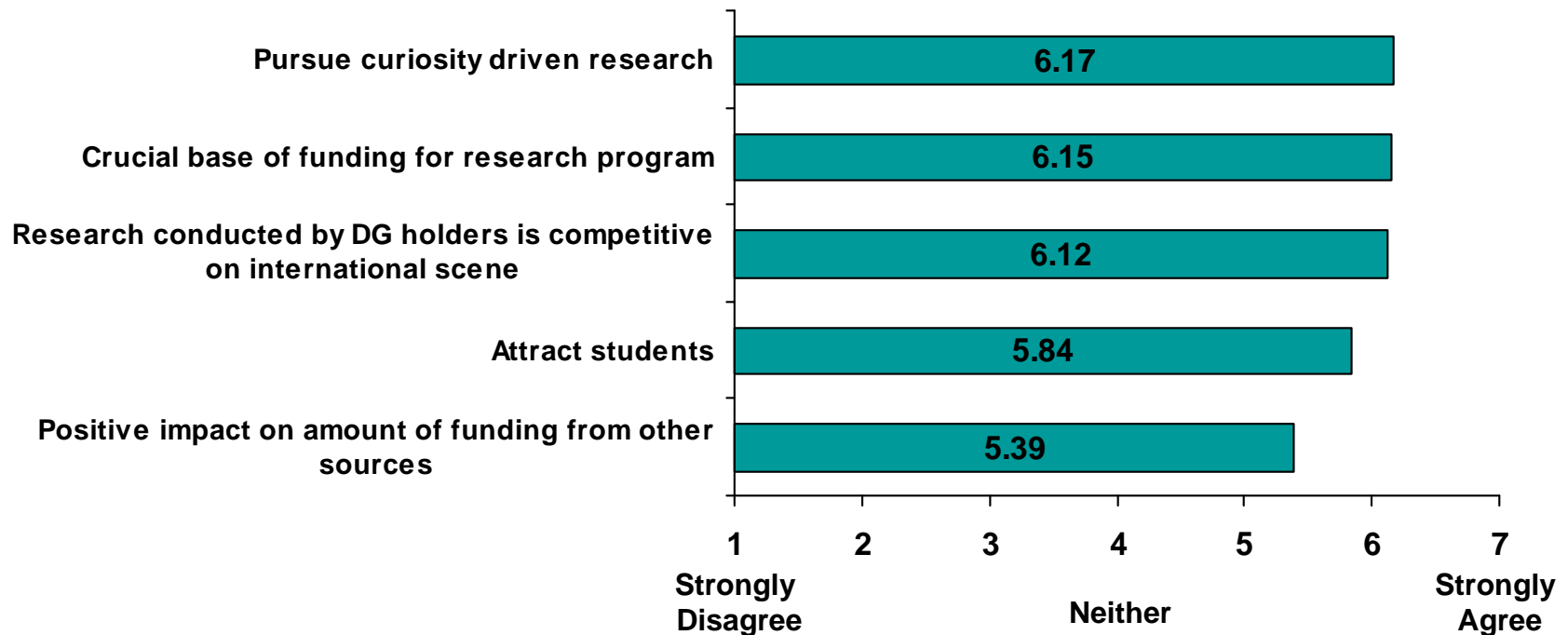
# Profile of Researchers: Research Team

Total Research Team	Funded Researchers				Non-funded Researchers			
	Canadian		International		Canadian		International	
	$\mu$	% (total)	$\mu$	% (total)	$\mu$	% (total)	$\mu$	% (total)
Undergraduate students	2.22	28%	0.55	4%	1.42	34%	.2	5%
Masters students	1.88	25%	1.06	9%	1.26	30%	.37	9%
PhD students	1.78	22%	1.27	12%	.62	15%	.28	7%
Subtotal		75%		25%		79%		21%
Postdoctoral fellows	0.56	47%	0.70	53%	.25	61%	.16	39%
Research associates	.59	1196			.22	29%		
Technicians	.67	1365			.35	45%		
Other (please specify)	.67	286			.21	26%		



# Impacts: Impacts of Discovery Grant funding on researchers (Q5)

Please rate the extent to which you agree or disagree with each of the following ...



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

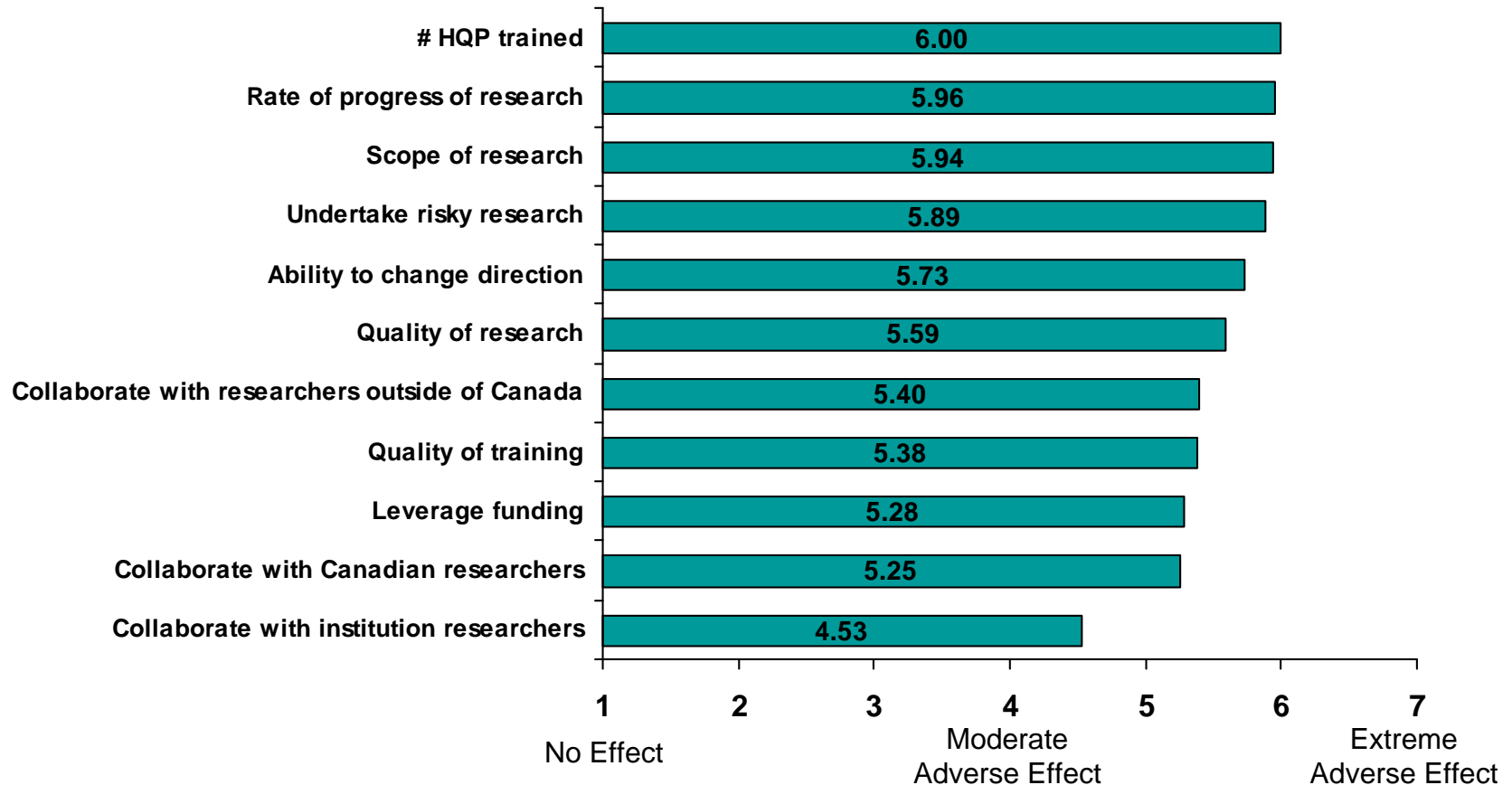


## Impacts: Key Findings (Q5)

- Notable differences by grant size and broad discipline group
  - Researchers with more funding are more likely to agree that DG funding has had an impact on researchers
  - DG funding has helped researchers in Engineering to obtain funding from other sources more than researchers in other disciplines



## Impacts: If NSERC DG funds were not available to you, how much of an effect would this have on your research with respect to ... (Q6)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

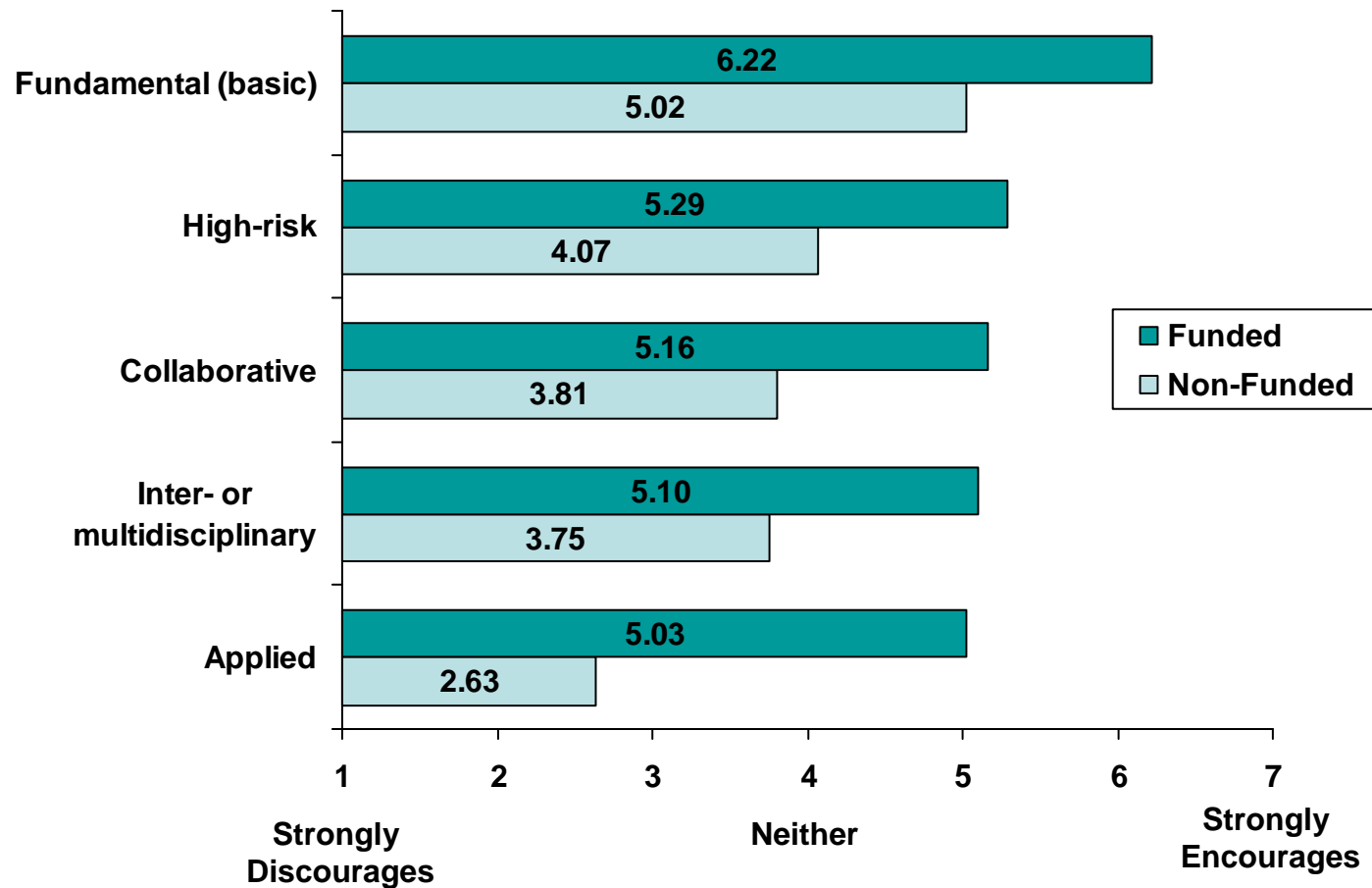


## Impacts: Key Findings (Q6)

- Notable differences by grant size, broad discipline group and university size
  - Researchers with larger grants are more likely to cite adverse effects
  - Researchers in Life Sciences and Physical Sciences are more likely to cite adverse effects
  - Researchers at small and medium universities are more likely to cite adverse effects



## Impacts: How would you rate the Discovery Grants program in terms of encouraging the following kinds of research in your field? (Q7)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

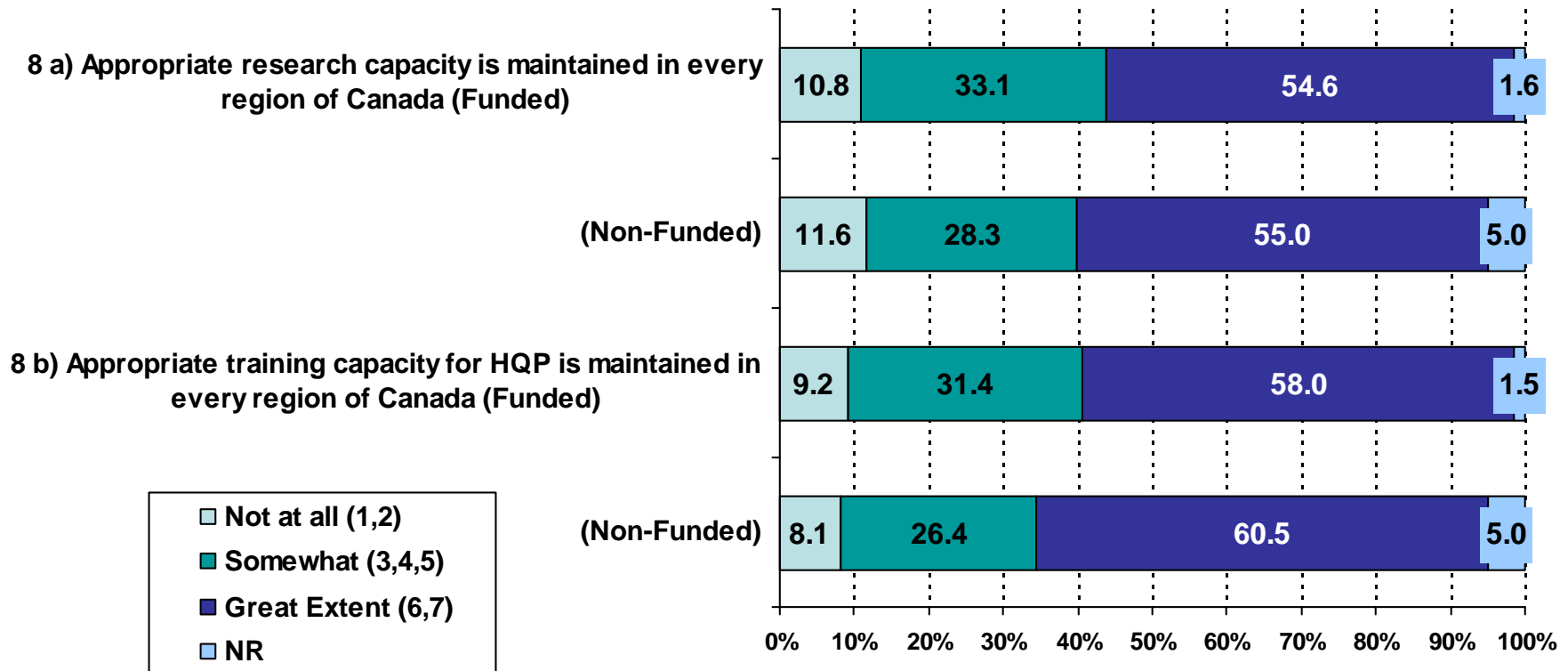


## Impacts: Key Findings (Q7)

- Funded researchers are more likely than non-funded researchers to indicate that the DG program encourages all types of research
- Funded Researchers
  - Researchers in Life Sciences are more likely than other researchers to indicate that DG encourages fundamental research
  - Researchers in Engineering are more likely than other researchers to indicate that DG encourages high-risk research
  - Researchers in Mathematical Sciences are more likely than other researchers to indicate that DG encourages collaborative research
  - Researchers in Life Sciences are less likely than other researchers to indicate that DG encourages applied research



# Impacts: To what extent do you believe the DG Program *should* ensure that an ... (Q8)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

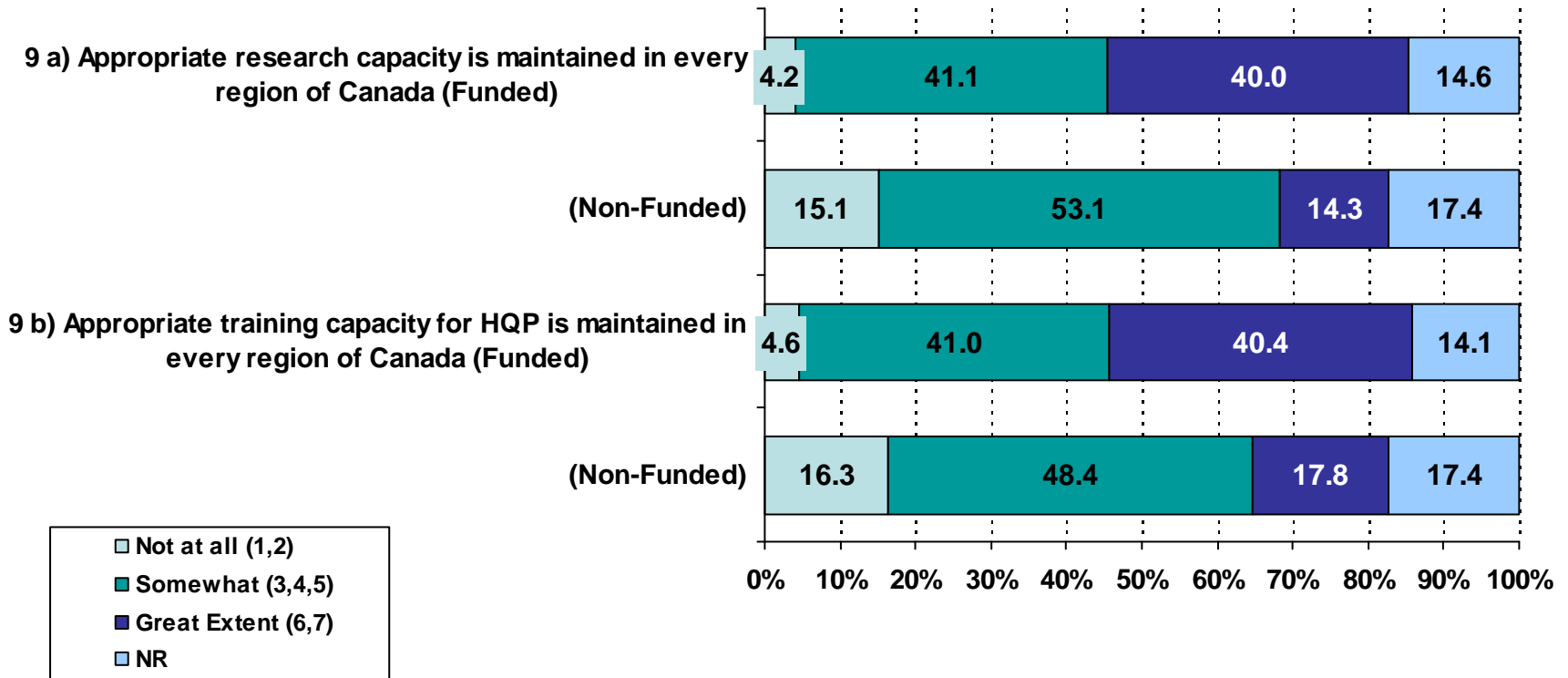


## Impacts: Findings (Q8)

- Responses of funded and non-funded researchers are similar
  - Majority of both funded and non-funded believe that the DG program should ensure appropriate research and training capacity
- Funded Researchers
  - Researchers in Physical Sciences are less likely than those in Life Sciences and Engineering to indicate that DG should support research capacity and training capacity for HQP



# Impacts: To what extent does the DG Program *succeed* in ensuring that an ... (Q9)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

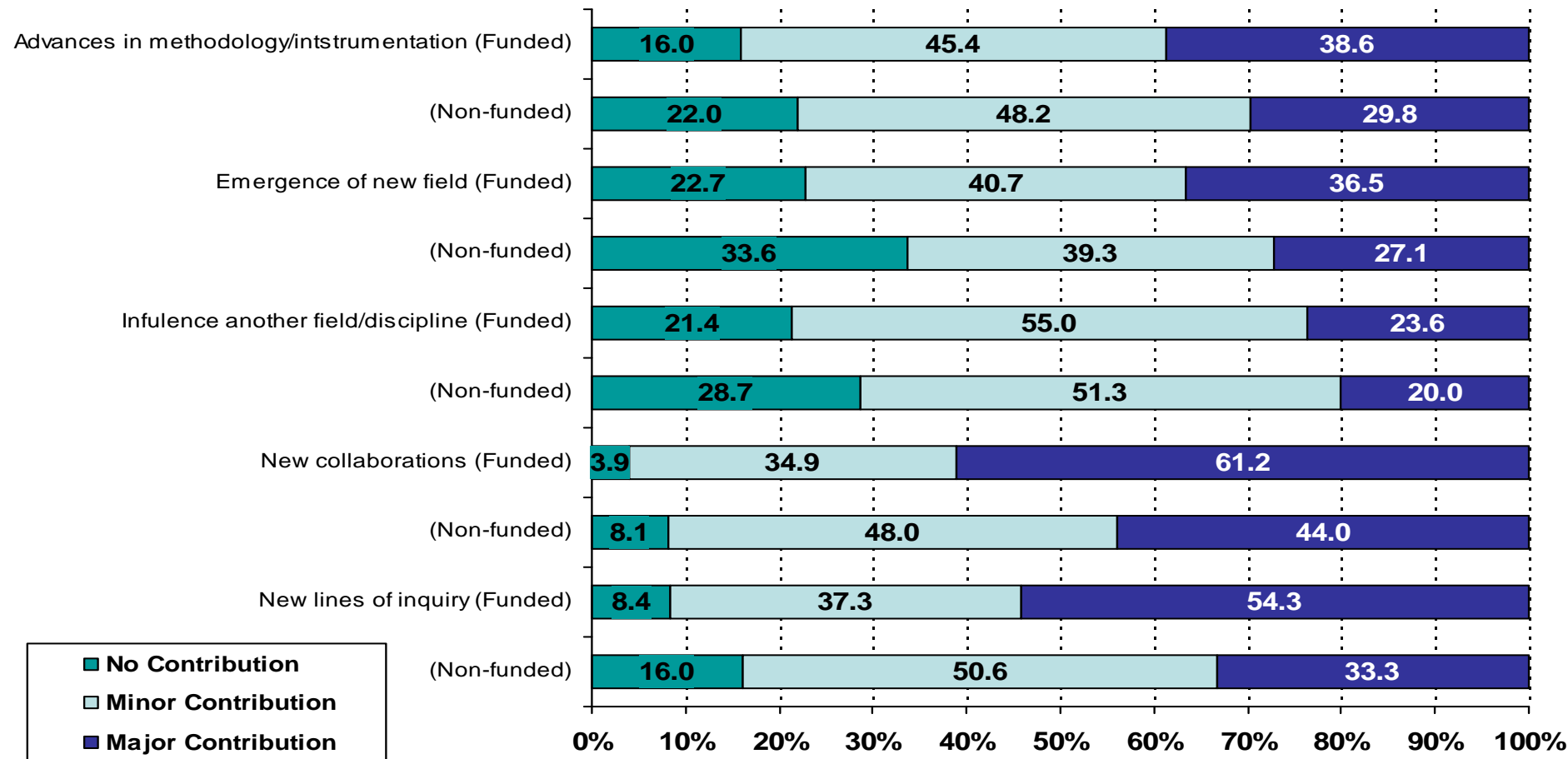


## Impacts: Findings (Q9)

- Responses of funded and non-funded researchers differ significantly
  - Non-funded researchers are less likely than funded researchers to indicate that DG succeeds in ensuring appropriate research and training capacity
- Funded Researchers
  - Researchers at large universities are less likely than those at medium-sized universities to indicate that Discovery Grants succeed in ensuring appropriate research capacity
  - Researchers at medium universities are more likely than those at large universities to indicate that DG succeed in ensuring appropriate training capacity for HQP



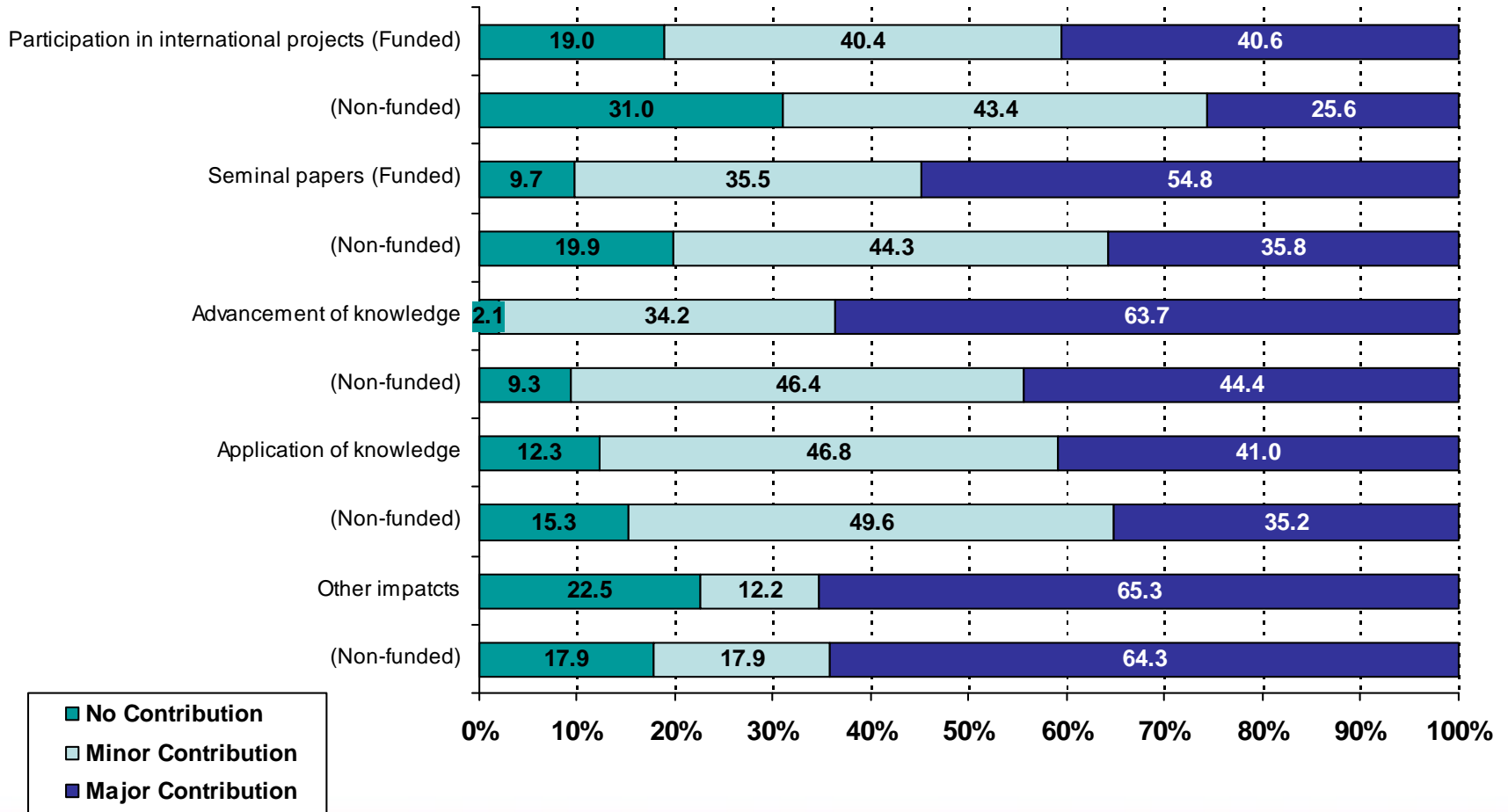
# Impacts: Over the course of your career, to what extent have the results of your research contributed to the following scientific impacts? (Q11)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



# Impacts: Over the course of your career, to what extent have the results of your research contributed to the following scientific impacts? (Q11)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



## Impacts: Findings (Q11)

- Funded researchers more likely than non-funded to indicate that their research results have made a major contribution to scientific impacts
- Specifically, funded researchers more likely to indicate a major contribution to:
  - Advances in methodology and instrumentation
  - New collaborations
  - Opened lines of inquiry
  - Participation in international projects
  - Significant advancement of knowledge
  - Significant application of knowledge

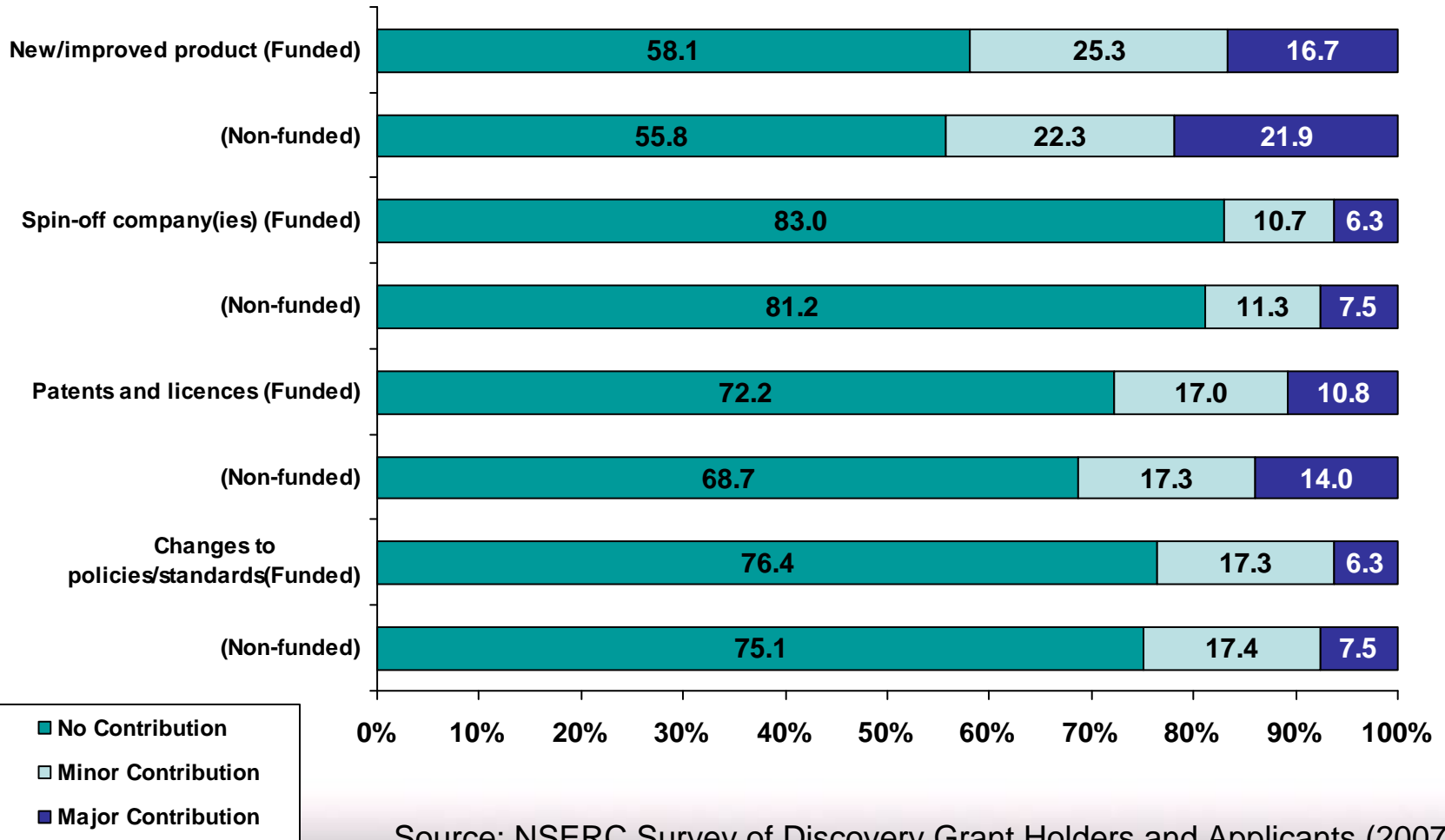


## Impacts: Findings (Q11)

- Funded researchers with the largest grants are more likely to indicate major contributions to:
  - Emergence of a new field
  - Influence on another field or discipline
  - Opening new lines of inquiry
  - Participation in international projects
  - Seminal papers in their discipline
  - Significant advancement of knowledge
- Funded researchers at large universities are more likely than those at small universities to indicate major contributions to:
  - Emergence of a new field
  - Influence on another field or discipline
  - Opening new lines of inquiry
  - Significant advancement of knowledge



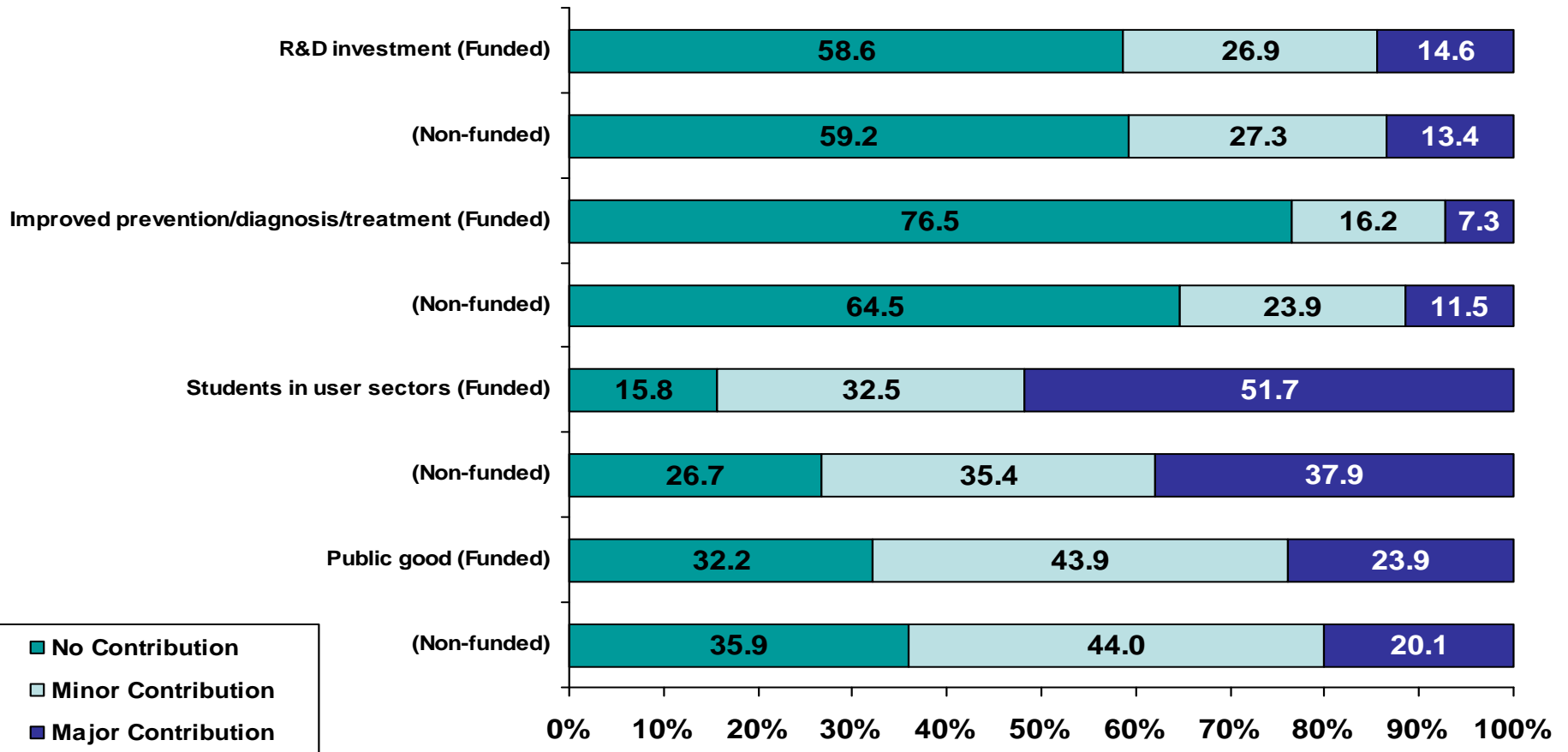
# Impacts: Over the course of your career, to what extent have the results of your [Discovery Grant funded] research contributed to the following socio-economic impacts? (Q12)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



# Impacts: Over the course of your career, to what extent have the results of your [Discovery Grant funded] research contributed to the following socio-economic impacts? (Q12)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



## Impacts: Findings (Q12)

- Overall, the extent of research contributions to socio-economic impacts are similar for funded and non-funded researchers
  - Funded researchers are more likely to indicate no contribution to improvements to prevention, diagnosis or treatment of injury or disease
  - Funded researchers are more likely to indicate a major contribution to the placement of students in industry sectors that are relevant to their training



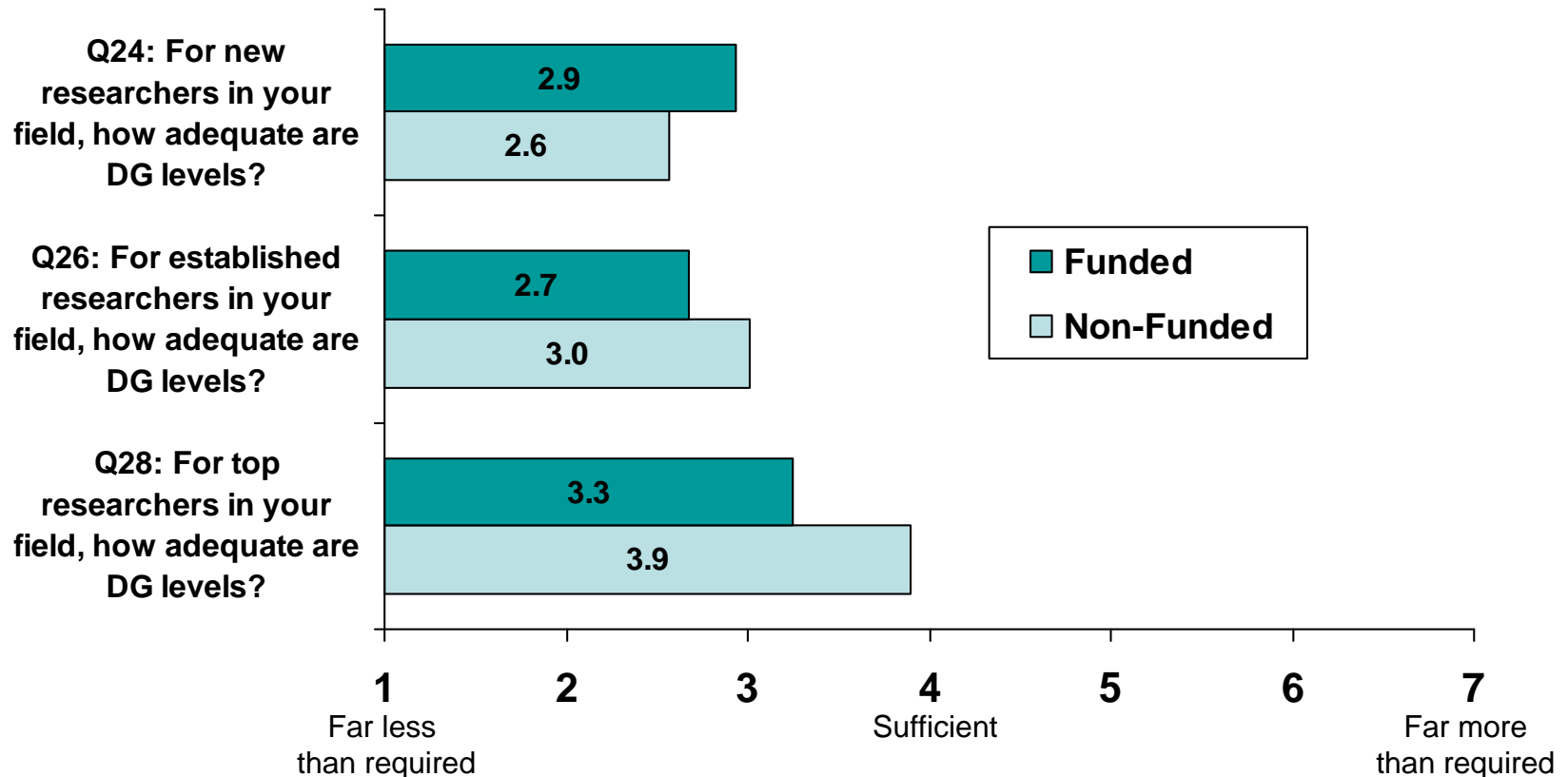
## Impacts: Findings (Q12)

- **Funded Researchers**

- Researchers in Engineering are more likely than researchers from other disciplines to indicate research has made major contributions to:
  - the development of a new or improved product or process by industry; and
  - further R&D investments being made by industry or the investment community
- Researchers with the largest grants are more likely to indicate that research has made a major contribution to the placement of students in user sectors that are relevant to their training
- Professors and Professors Emeriti are more likely than Assistant Professors and Associate Professors to indicate that research has made a major contribution to the placement of students in user sectors that are relevant to their training



# Distribution: Level of funding within the DG Program (Q24, Q26 & Q28)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



## Distribution: Findings (Q24, Q26 & Q28)

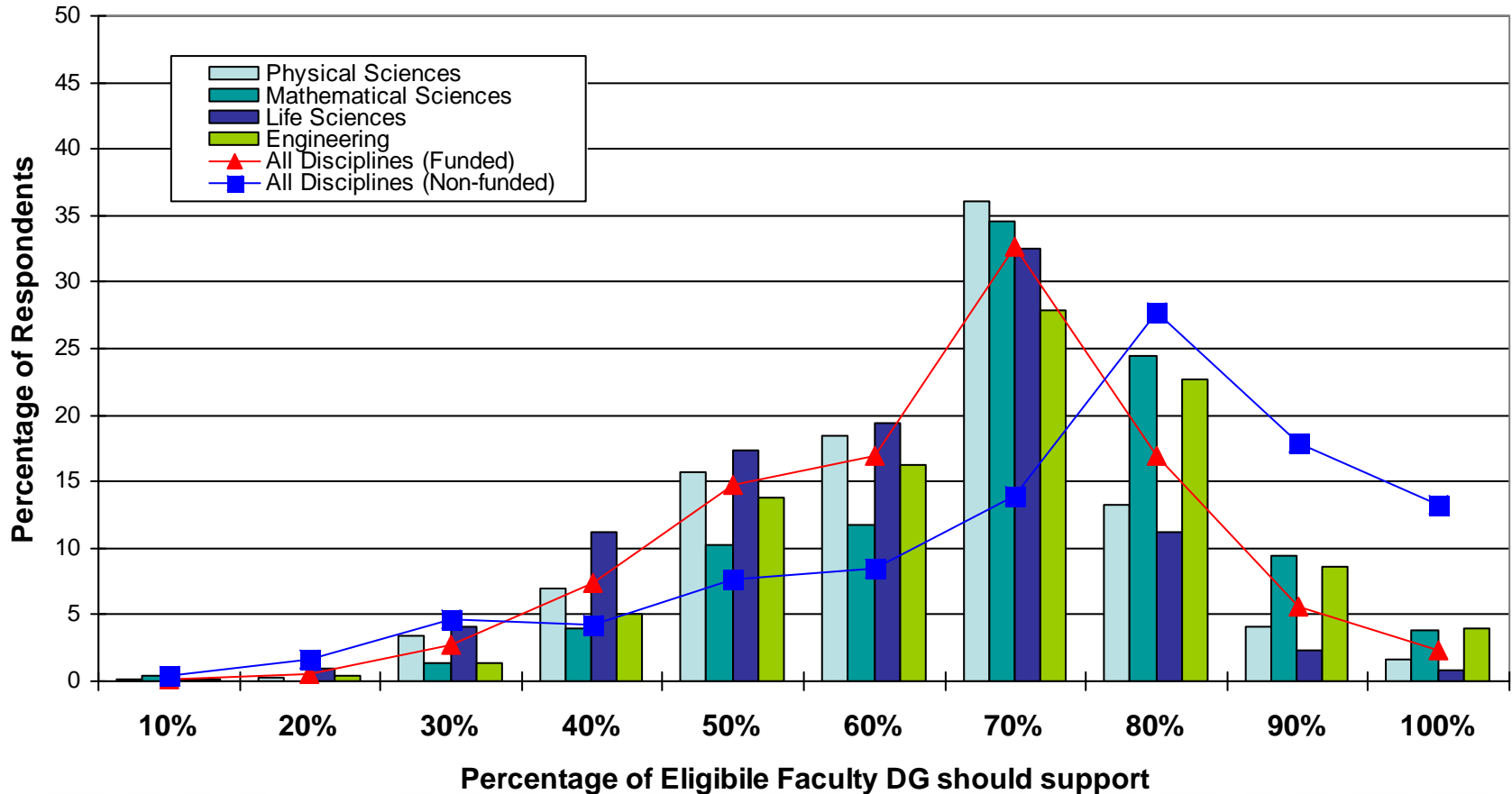
- **Q24: New Researchers**
  - Non-funded researchers are more likely to rate DG levels as less than required than funded
  - Funded researchers from the Life Sciences are more likely to rate DG levels as less than required than all other disciplines
- **Q26: Established Researchers**
  - Funded researchers are more likely to rate DG levels as less than required than non-funded
  - For both funded and non-funded researchers, the larger the university the more likely researchers are to indicate that funding is inadequate
- **Q28: Star Researchers**
  - Non-funded researchers are more likely to rate DG levels as sufficient than funded
  - Funded researchers with largest grants are more likely to rate DG levels as less than required than other researchers
  - Funded researchers from large universities are more likely to rate DG levels as less than required than medium-sized or small universities



# Distribution: Amount of DG Program Grants (Q25, Q27 & Q29)

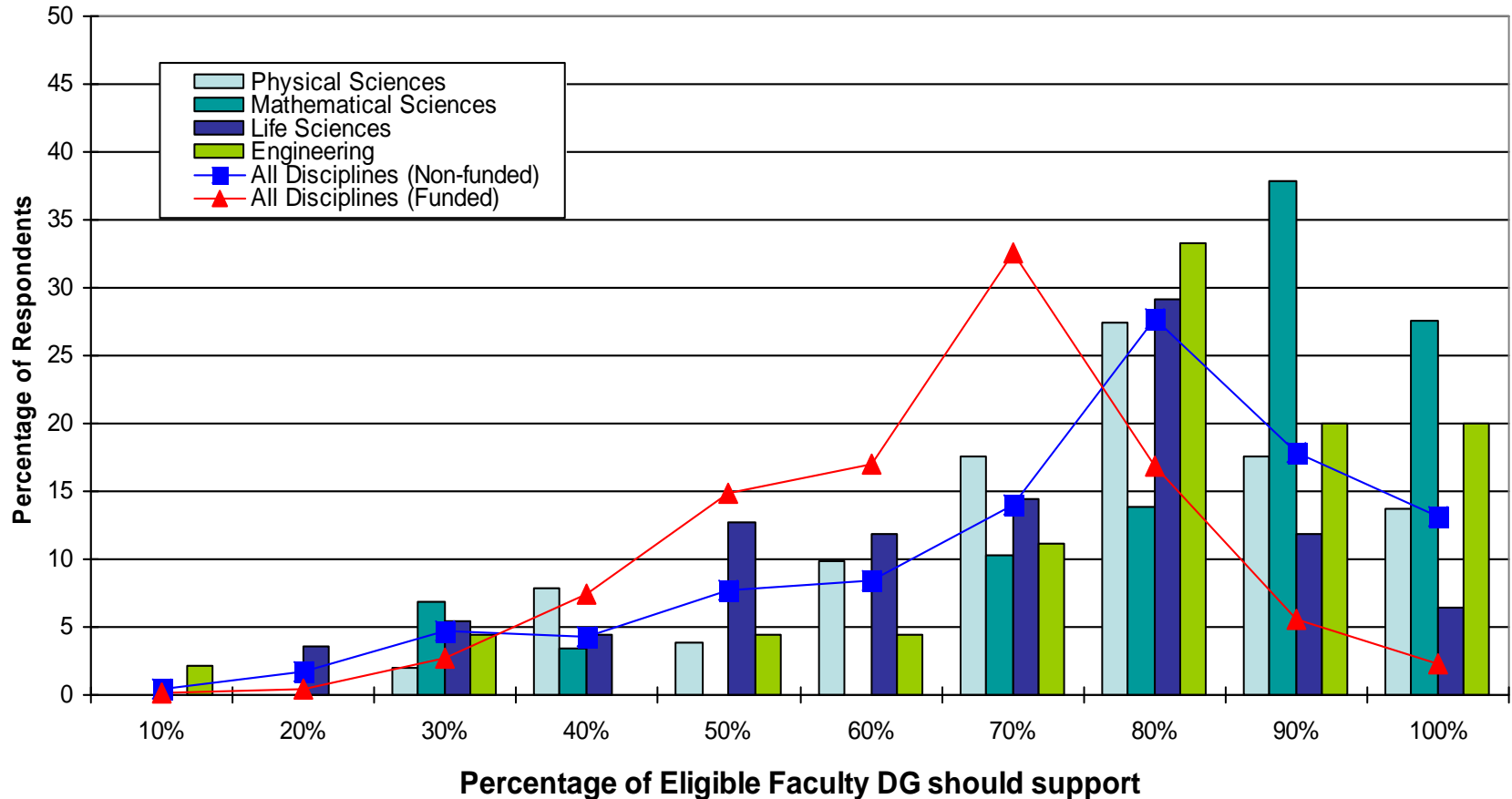
Type of Researcher	Actual DG Funding (2006-07)	Sufficient Amount Suggested by Researchers			
		Funded		Non-funded	
	Mean	Mean	Median	Mean	Median
New Researcher	\$20,386	\$36,022	\$30,000	\$41,928	\$35,000
Established Researcher	\$33,216	\$59,174	\$50,000	\$52,890	\$45,000
Star Researcher	\$62,291	\$101,102	\$85,000	\$105,047	\$77,500

## Distribution: Percentage of Eligible Faculty that should be supported by DG (Q30 Funded -- Broad Discipline Groups)



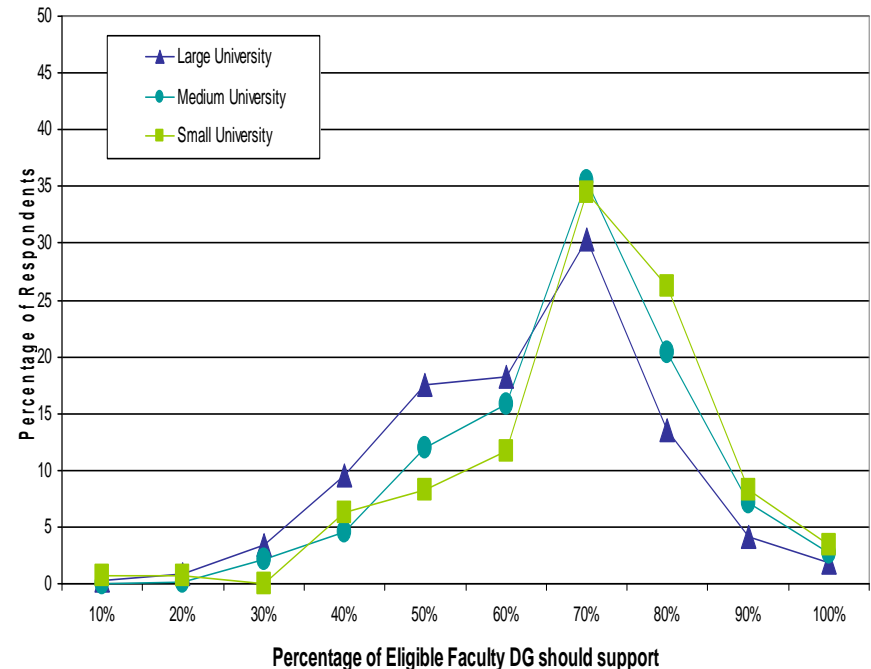
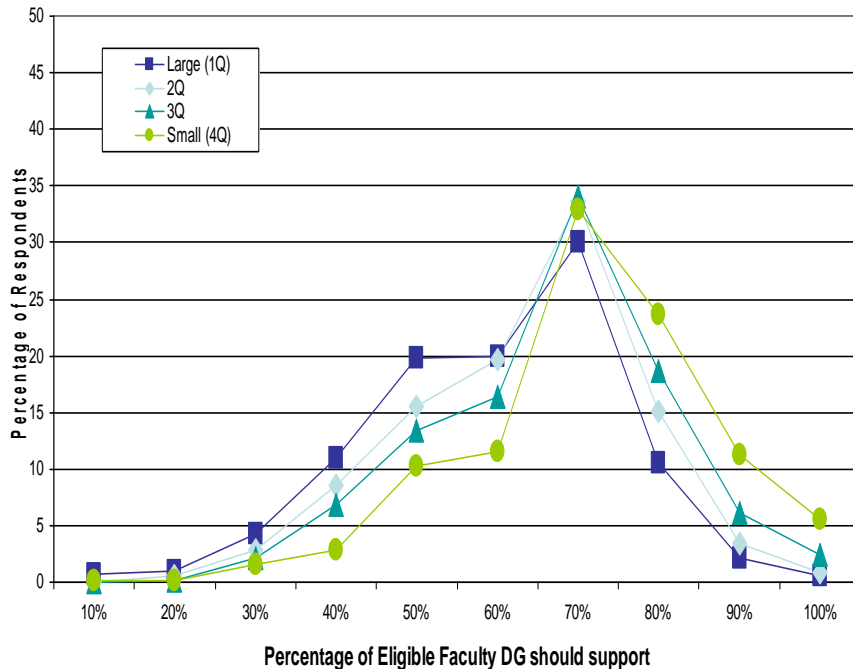
Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

## Distribution: Percentage of Eligible Faculty that should be supported by DG (Non-funded -- Broad Discipline Groups)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

# Distribution: Percentage of Eligible Faculty that should be supported by DG (Q30)



- For funded researchers, the pattern of response by grant size and university size are very similar

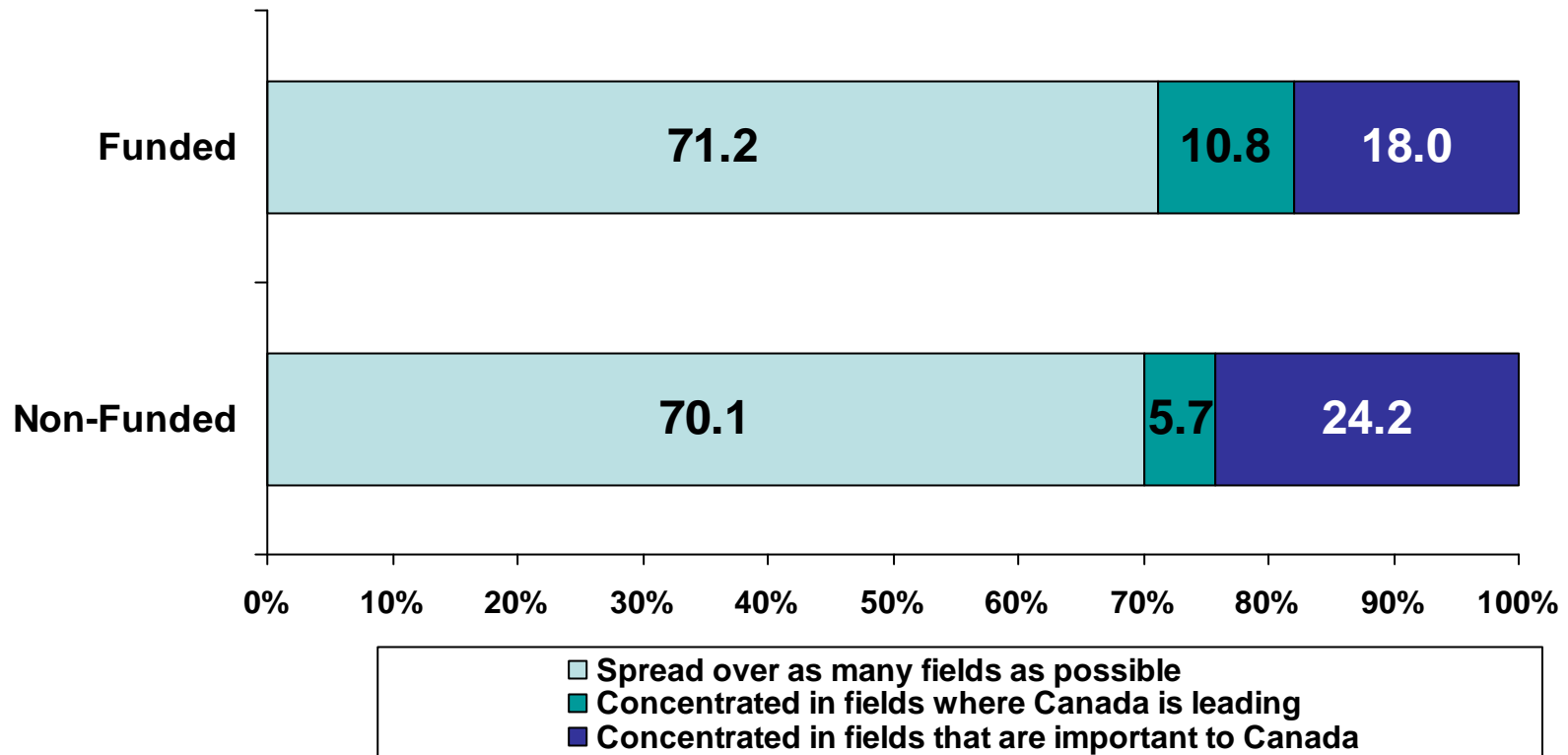


## Distribution: Findings (Q30)

- Not surprisingly, the views of funded and non-funded researchers differ with regard to the percentage of eligible faculty who should receive DG support
  - Funded: Mean (65.2%); Median (70%)
  - Non-funded: Mean (73.7%); Median (80%)
- Funded Researchers
  - Researchers from small and medium more likely than large to indicate a higher percentage of eligible faculty should receive DG support
  - Researchers with smaller grants are more likely to suggest a higher percentage of eligible faculty should receive DG support



## Distribution: Placement of Program Funding (Q31a)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).

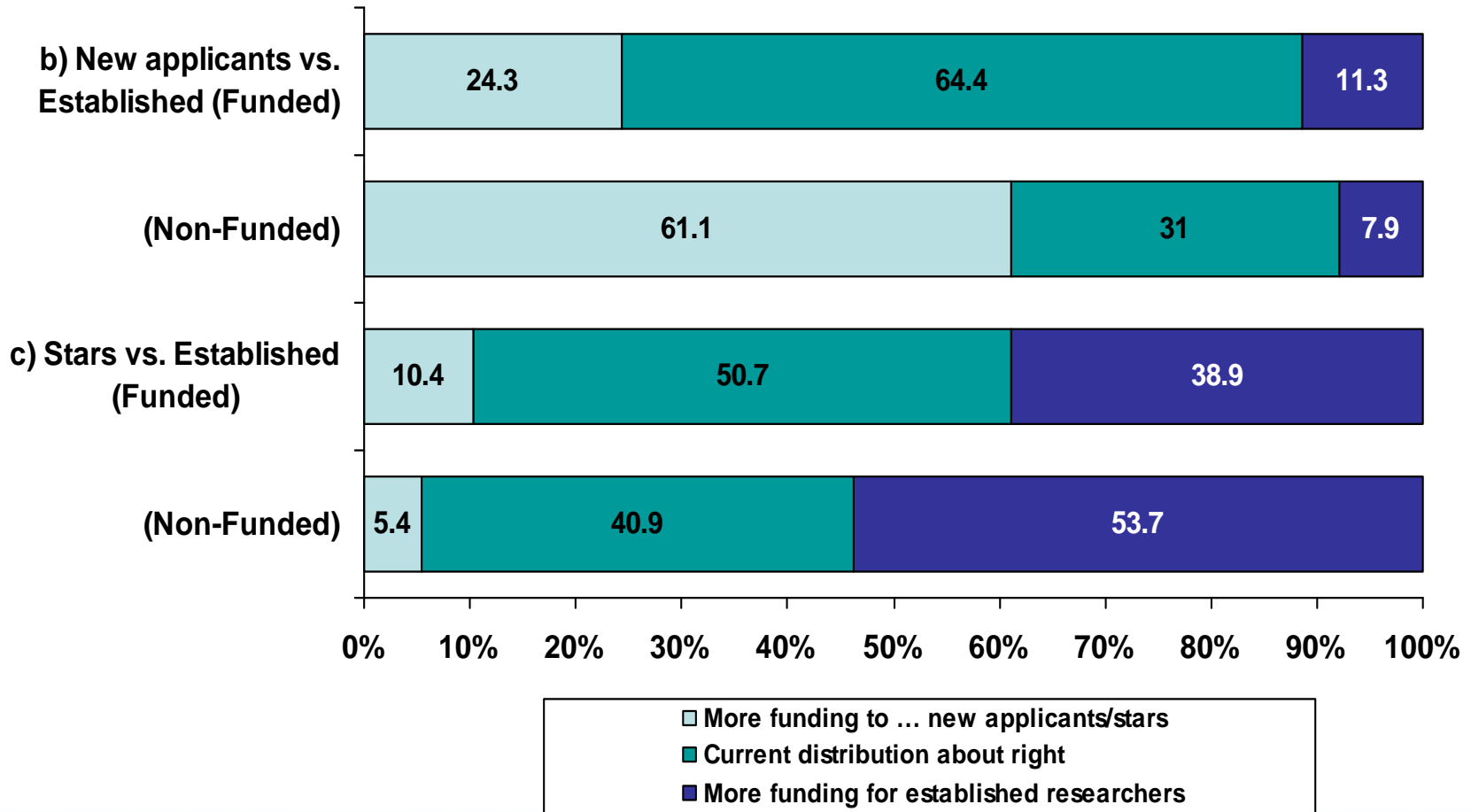


## Distribution: Findings (Q31a)

- Majority of all researchers indicate that funding should be spread over as many fields as possible
  - A greater percentage of non-funded researchers indicate that funding should be concentrated in fields that are important to Canada
- Funded Researchers
  - Researchers from Life Sciences more likely than those from Engineering to indicate that funding should be spread over as many fields as possible
  - Researchers from Engineering more likely than those from Life Sciences to indicate that funding should be concentrated in fields that are important to Canada



# Distribution: Target for Program Funding (Q31 b & c)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



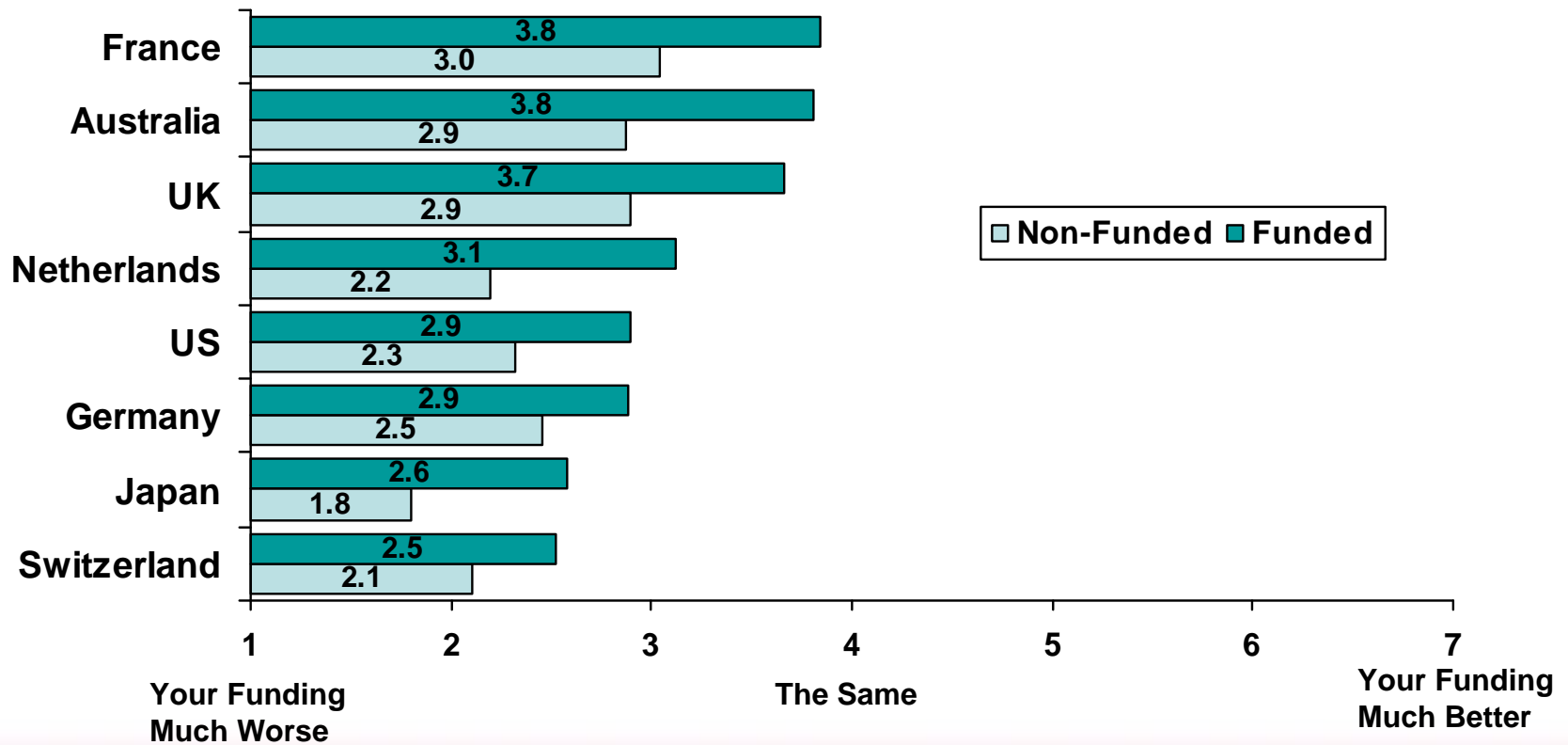
## Distribution: Findings (Q31b & c)

- **Funded Researchers**

- Assistant Professors are more likely than Professors and Professors Emeritus to suggest more funding for new applicants at the cost of established
- New researchers (less than five years in their first faculty position) are more likely than established researchers (more than 11 years) to indicate more funding for new applicants at the cost of established
- Researchers with the smallest grants more likely than those with the largest grants to indicate more funding for established researchers at the cost of stars
- Associate Professors more likely than Professors Emeritus to indicate more funding for established researchers at cost of stars



## Distribution: How does your overall funding compare with the funding your colleagues receive for the direct costs of research in the following countries? (Q34)



Source: NSERC Survey of Discovery Grant Holders and Applicants (2007).



## Distribution: Findings (Q34)

- Researchers most familiar with funding levels in US and UK
- All researchers indicate their overall funding levels are worse than their colleagues from the listed countries
  - Non-funded researchers rate funding levels lower than funded researchers
- Funded Researchers
  - Researchers at large universities rate funding levels lower than medium and small universities
  - Researchers in the Mathematical Sciences rate funding levels higher than other disciplines



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