

# Gender Equality in the Field of Science and Technology in Japan

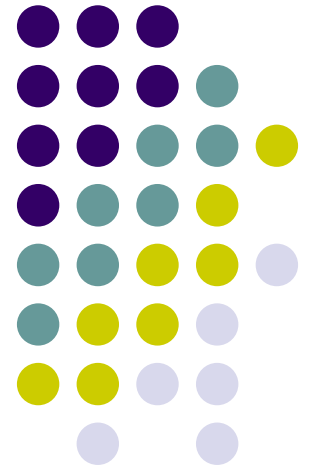
Based on a Questionnaire Survey by EPMEWSE



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# EPMEWSE Renraku-kai



*Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering (EPMEWSE)*

## 男女共同参画学協会連絡会

*Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering (EPMEWSE)*

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| 2004.10.7  | <a href="#">男女共同参画学協会 2周年記念行事</a>  |
| 2004.9.2   | <a href="#">応用物理学会男女共同参画2004年秋のミーティング<br/>(男女共同参画学協会連絡会共催)</a><br>若手からの提言「多様化するライフスタイルとキャリアプラン」～若手技術者・研究者の未来予想図～ |
| 2004.4.    | <a href="#">統一アンケート調査結果公表<br/>(2003年、21世紀の多様化する科学技術研究者の理想像)</a>  |
| 2003.10.7  | <a href="#">男女共同参画学協会 1周年記念行事</a>  |
| 2002.10.7  | <a href="#">男女共同参画学協会 連絡会 設立集会</a>   |



# Questionnaire Survey Conducted by EPMEWSE



Commissioned by MEXT Japan (FY2003)

## Diverse Visions of Scientists and Engineers in the 21st Century For the Promotion of Gender Equality

Kashiko Kodate  
Planning and Execution Representative

Masako Bando  
EPMEWSE Chairperson

On-line version (pdf format)

<http://annex.jsap.or.jp/renrakukai/2003enquete/>

Report on the MEXT-Commissioned Project in FY2003

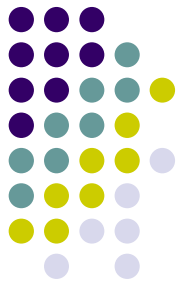
Diverse Visions of Scientists and Engineers  
in the 21st Century  
—For the Promotion of Gender Equality—

March 2004

Japan Inter-Society Liaison Association Committee for  
Promoting Equal Participation of Men and Women in Science  
and Engineering (EPMEWSE)



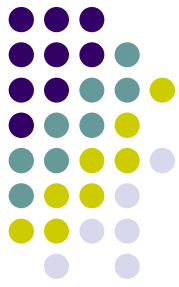
# Overview of the Survey



- Period: August 20 – November 10, 2003
- We sent: All the members of 39 academic societies (more than 300,000 members)
- Questionnaire Format: Web and Paper
  
- # of Respondents: 19,291 (96.5 % by Web format)
- Gender Ratio: Male 83.7 % , Female 16.1 % , N/A 0.2 %



# Academic Societies Involved in the Project



## **Mathematics field**

Mathematics

## **Electronics and information field**

Elec. Info. Comm., Image Info. Tv, Info. Process., Illum. Eng.

## **Physics field**

Appl. Phys., Atomic Energy, Astronomy, Physics, Magnetics, SGEPPS

## **Chemical and material engineering field**

Chem. Eng., Polymer Sci., Chemistry, Electrochem., Liq. Crystal, Fire Sci. Eng., Metal, Iron Steel, Anal. Chem.

## **Life science and biology field**

Bio. Space, Cell Biology, Plant Physio., Biochemistry, Biophysics, Physiology, Protein Sci., Zoology, Develop. Bio., Comp. Endocr., Mol. Biology, Math. Bio.

## **Civil engineering field**

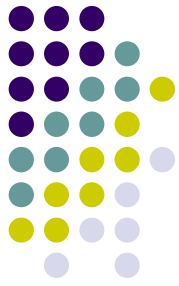
Geotech., Architecture

## **Mechanical engineering field**

Automo. Eng., Precision Eng., Mechanic. Eng.



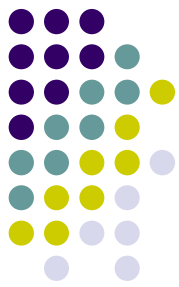
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# Survey Preparation/Analysis Working Group



## EPMEWSE Survey Preparation Working Group (Coordinator: Kay Domen)

Miyoshi Ayama (JSAP*)	Reiko Saito (SPSJ)	Hiroshi Nakajima (JBS)
Hisako Otsubo (MBSJ)	Emi Tamechika (JSAP)	Yoko Matsumoto (ISIJ)
Junko Kyozuka (JSPP)	Kaori Tomita (JSBSS)	Miyoko Watanabe (JSAP)
Takashi Kondo (JSAP)	Akiko Matsumoto (CSJ)	Kaori Ota (MathSJ)
Hiroko Tsukamura (JSCE)	Setsuko Washitani (ZSJ)	Mizue Yamauchi, Kissyo (SJWS)
Kay Domen (JSAP)	Yuri Ishimaru (JPS)	Yoshiko Matsuda (JBS)
Mariko Kato (ASJ)	Yuji Goto (PSSJ)	Yuriko Yamagata (PSSJ)
Akiko Kogo (ZSJ)	Ken Takamatsu (PSJ)	Yasuko Ando (MgSJ)
Kenichi Shida (SPSJ)	Yoshiko Tsuji (SCEJ)	Shoko Ono (CSJ)
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Kazue Mizumura (PSJ)		

## EPMEWSE Survey Analysis Working Group (Coordinator: Takashi Kondo)

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Takayuki Oda (MatchSJ)	Yuji Goto (PSSJ)	Yoshiko Matsuda (JBS)
Yoko Kimura (MBSJ)	Emi Tamechika (JSAP)	Sanae Miyake (BMSJ)
Kashiko Kodate (JSAP)	Yoshikazu Toyama (JSAP)	Junko Ogawa (AESJ)
Reiko Saito (SPSJ)	Hiroshi Matsukawa (JPS)	Mizue Yamauchi, Kissho (SJWS)
Kay Domen (JSAP)	Keiko Mitsunaga Nakatsubo (ZSJ)	Kimiko Fukuta (JSDS)
Akiko Kogo (ZSJ)	Kazue Mizumura (PSJ)	Hiroshi Ooki (JSAP)
Takashi Kondo (JSAP)	Miyoko Watanabe (JSAP)	Hiroshi Kawarada (JSAP)
Yoshiko Tsuji (SCEJ)	Yuko Ikeda (SPSJ)	Yuki Kunioka (BSJ)
Kiyoko Fukami (JBS)	Mariko Kato (ASJ)	Yukiko Goto (JSCB)
Akiko Matsumoto (CSJ)	Noriko Chikumoto (JSAP)	Michika Murata (JPS)

## Questionnaire Adapted from Gender Equality Survey of Science and Technology Professionals

1. Age     24 or under  25-29  30-34  35-39  40-44  45-49  50-54  55-59  60 or above
2. Gender     Male  Female
3. Marital status     Married  Single
4. Children    How many children do you have?  None  1  2  3  4 or more  
    Their age(s) (mark all that apply):  Below school age  Primary school age  Junior High school age  
     High school age  Undergraduate Working  Other
5. What is your highest academic degree?     Undergraduate  Master's  Ph.D.  Other
6. Do you hold a doctoral degree? If you do, what type of degree is it? Mark both "course" and "non-course" if appropriate.     I don't have a doctoral degree  Course  Non-course  
(Note: "Course" doctorates are conferred upon those who complete graduate school courses, whereas "non-course" doctorates do not require enrollment in the graduate school.)



7. To which academic societies do you belong? Mark all that apply.

- The Mathematical Society of Japan
- The Physical Society of Japan
- Atomic Energy Society of Japan
- Astronomical Society of Japan
- Japanese Society for Biological Sciences in Space
- The Japan Society of Applied Physics
- The Magnetics Society of Japan
- The Institute of Electronics, Information and Communication Engineers
- Information Processing Society of Japan
- The Chemical Society of Japan
- The Society of Chemical Engineers, Japan
- The Electrochemical Society of Japan
- The Society of Polymer Science, Japan
- The Japan Society for Analytical Chemistry
- The Japanese Biochemical Society
- The Japanese Society of Plant Physiologists
- The Biophysical Society of Japan
- Protein Science Society of Japan
- Physiological Society of Japan
- The Japan Society for Comparative Endocrinology
- The Zoological Society of Japan
- The Molecular Biology Society of Japan
- The Japanese Society of Developmental Biologist
- Japan Society for Cell Biology
- The Japanese Geotechnical Society
- The Institute of Image Information and Television Engineers
- Society of Automotive Engineers of Japan, Inc.
- The Illuminating Engineering Institute of Japan
- The Japan Society for Precision Engineering
- The Japan Society of Mechanical Engineering
- Architectural Institute of Japan
- The Iron and Steel Institute of Japan
- Japanese Liquid Crystal Society
- The Society of Japanese Women Scientists
- Japanese Women Engineers Forum
- Society of Geomagnetism and Earth, Planetary and Space Sciences
- The Japan Institute of Metal
- Japan Association for Fire Science and Engineering
- Japanese Society for Mathematical Biology
- Other

8. What is your current employment status?  Student  Full-time employee (permanent position)  
 Full-time (with limited-term contract)  Part-time employee  Unemployed  Other  
If you are employed on a limited-term contract, how many years is your term?  Less than 2 years  
 Over 2 but less than 3 years  Over 3 but less than 5 years  5 years or more  
Is your contract renewable?  Yes  No
9. What type of organization do you belong to? (If you have left work, please respond to questions 9-16 with your most recent position in mind.)  Corporation  National university  
 Public university (municipal)  Private university  Other educational institution  
 Public research institution (national research institution, corporation, foundation, etc.)  Other
10. What is your current position?
- Corporation
- Entry-level employee  Team/group leader or senior researcher/scientist
  - Section head or laboratory chief  Department/division head or director
  - Operations manager/director  Executive director/officer or above  Other
- University
- Undergraduate student  Graduate student  Research student  Post-doctoral fellow
  - Technician  Research associate  Lecturer  Associate professor  Professor  Other
- Public research institution
- Post-doctoral fellow  Researcher/scientist  Senior researcher/scientist
  - Team/group laboratory chief/head  Division/department head or director
  - Operations manager/director  Other

11. Hours spent at your workplace
- 11.1 How many hours per week do you spend at your workplace?  
 Under 20  20-39  40-49  50-69  70-89  90 or over
- 11.2 How many of the above hours do you spend on research and development?  
 0  1-9  10-19  20-39  40-49  50-69  70-89  90 or over
12. Hours spent working from home
- 12.1 How many hours per week do you work at home?  
 0  1-4  5-9  10-29  30 or above
- 12.2 How many of the above hours do you spend on research and development?  
 0  1-4  5-9  10-29  30 or above
13. How many people do you supervise? (If you are with a university, how many people do you advise, excluding undergraduates?)  0  1-3  4-6  7-15  16-30  31 or more
14. What is your total annual research and development budget, excluding personnel costs? If you are representing your research group or project team, please check the total amount allocated to your group/team.  
 0 yen  Under 500,000 yen  500,000-1,000,000 yen  1,000,000-5,000,000 yen  
 5,000,000-20,000,000 yen  20,000,000-50,000,000 yen  50,000,000 yen or above
15. Why did you choose your current occupation? Mark all that apply.
- For academic satisfaction/intellectual stimulation
  - To make full use of my abilities
  - Because I find this work attractive
  - To earn a high income
  - Job security
  - Able to balance family and career
  - Free of gender discrimination
  - To benefit society
  - To achieve status/fame
  - No other satisfactory work was available
  - Because I was offered the job
  - Parents/ friends recommended it
  - Near my home
  - No relocation required
  - Flexible working hours
  - Other

16. Your future career path (For those who have left work, please respond as you would have in your most recent position.)
- 16.1 In the future, what type of position do you wish to hold? (If you wish to continue in your present position, please respond as such.)
- Local government
  - Entrepreneur
  - Not sure
  - Other
- 16.2 Please choose up to 5 factors you consider important in achieving that position. Mark all that apply.
- Talent
  - Dedication
  - Physical strength
  - Efficiency
  - Time spent on work
  - Social skills
  - Gender
  - Personal connections
  - Cooperation from or mentoring by one's supervisors
  - Support from family
  - System of hiring, evaluation and promotion
  - Social support systems
  - Location of work
  - Don't know
- 16.3 Please rate the likelihood of your achieving your desired position.
- Already achieved
  - Possible with some effort
  - Unlikely
  - Don't know
17. Have you ever considered leaving/changing your job or have you ever actually left/changed jobs?
- I have left work
  - I have changed jobs
  - I have considered leaving work
  - I have considered changing jobs
  - I have neither considered leaving/changing nor actually left/changed jobs
- 17.1 If you have ever left work or changed jobs, please mark the reason(s). Mark all that apply.
- To further my career
  - Better income
  - To avoid relocation required by previous employer
  - Job relocation of family member
  - Workplace location
  - End of contract
  - Marriage
  - Childrearing
  - Caring for sick family member
  - Concern for the future
  - Gender discrimination
  - Difficult personal relations
  - Unhappy with previous workplace
  - Laid-off or dismissed
  - Other
- 17.2 If you have ever left or changed jobs, what was your subsequent employment status? Mark all that apply.
- Full-time
  - Full-time (limited-term contract)
  - Part-time
  - Other
- 17.3 Into what type of field did you move? Mark all that apply.
- University
  - National /public research institution
  - School education-related
  - Private enterprise (research and development)
  - Private enterprise (survey research and consulting)
  - Private enterprise (non-research related work)
  - Public administration
  - Other



18. What is your view on limited-term contracts (non-tenured positions), including post-doctoral positions?

- Should be introduced extensively
- Should be introduced cautiously
- Should be abolished
- Don't know

Reason(s) for your view (mark all that apply)

- Easy to change jobs
- Able to change jobs based on one's achievements
- Stimulates/contributes to research development within the organization
- Facilitates life planning
- Easy to return to work after childrearing break, and the like
- Cannot tackle/commit to large projects
- Makes life planning difficult
- Difficult to find next position
- Age restrictions
- Disadvantages in terms of social security/pensions and the like
- Other

19. If you have children, please answer this question.

19.1 Who was the primary caregiver for your children during working hours before they reached school age? Mark all that apply.

- Myself
- My spouse
- Cohabiting relatives
- Relatives or friends
- Day care center
- Babysitter

19.2 To what extent were you able to take childcare leave?

- Received sufficient leave
- Received leave, but it was insufficient
- Did not receive leave

Reason(s) (mark all that apply)

- I received support and understanding from my workplace
- I wanted to look after my children myself
- I couldn't find anyone to look after my children
- I received leave until my children entered day care
- I didn't want to interrupt my career
- I didn't want my income to decrease

- I didn't feel it was necessary
- I was able to find someone to look after my children
- There was no leave system
- There was an adequate leave system, but my workplace environment prevented me from taking leave
- Other

If you took leave, what was the average duration per each child, exclusive of maternity leave?

- Less than 1 month
- 1-3 months
- 3-6 months
- 6-12 months
- 12-24 months
- 24 months or more

19.3 If you took childcare leave, what was the subsequent effect on your working conditions? Mark all that apply.

- Continued same work as before leave
- Position changed
- Working section changed
- Pay increases and promotions were delayed
- I lost my job
- I left my job

19.4 How much childcare leave has your spouse taken (average per child, excluding maternity leave)?

- N/A-Unemployed
- Did not receive leave
- Less than 1 month
- 1-3 months
- 3-6 months
- 6-12 months
- 12-24 months
- 24 months or more

If your spouse did not take leave, what were the reason(s)? Mark all that apply.

- Too busy at work
- Didn't want income to decrease
- Didn't feel it necessary
- There was no leave system
- There was an adequate leave system, but my workplace environment prevented me from taking leave
- We were able to find someone to look after our children
- Other

20. What do you think is necessary to maintain a balance between work and childcare, caring for sick family members, and/or time for oneself? Mark all that apply.
- Diverse working styles
  - Shortened working hours
  - Change in work-centered mindset
  - Change in mindset regarding gender roles
  - Lessen distance between workplace and home
  - More paid holidays
  - Support staff for experiments
  - Home help
  - More daycare services
  - Better care services for the elderly
  - Diversified leave system
  - Financial support for childcare and elder care
  - Day care services for children who are ill
  - Government subsidies for the workplace while employees are on leave
  - Availability of replacement staff during leave
  - System to allow work at home during leave
  - Work-sharing system
  - More flexible working hours
  - Supportive working atmosphere
  - Other
  - Nothing in particular
21. How should organization handle those who take leave to care for children or sick family members? Mark all that apply.
- Reduce pay for duration of leave
  - Delay pay raises and promotions for the duration of leave
  - Continue to delay pay raises and promotions subsequent to leave
  - Give special consideration in the performance review to those who take leave
  - Deal with each case on an individual basis according to the person's ability and track record
  - Strict performance-based evaluations
  - Other
  - I don't know
22. What sort of environment and opportunities are necessary to further research and development? Mark all that apply.
- Time for research and development
  - Facilities for research and development
  - Research and development funds
  - Sponsorship/support for research and development
  - Opportunity for further study domestically and abroad
  - Understanding/cooperation of supervisors
  - Guidance by advisors
  - Freedom in research and development
  - Environment fostering long-term projects
  - Presence of collaborating researchers
  - Opportunities to educate students, entry-level employees, etc.
  - Opportunities to present research findings
  - Evaluation of research achievements
  - Appropriate evaluation of ability
  - Other's expectations of success
  - Other

23. Mark all that apply.

23.1 Why do you think there are fewer women than men in the science and technology fields?

- Educational environment
- Home environment
- Workplace environment
- Social gender roles
- Prejudice
- Gender-based differences in ability
- Gender-based differences in aptitude
- Women's mindset
- Men's mindset
- Lifetime employment system
- Lack of role models
- Difficult to maintain family and career
- Women hired less often than men
- Difficult to attain managerial positions
- Other

23.2 What do you think is the reason(s) for the low proportion of women in leadership positions?

- Evaluators' mindset or tendency to give preference to men
- Women have shown inadequate achievements
- Difficult to combine family and career
- Many women leave work or take leave mid-career
- Women are less eager for promotion than are men
- Gender-based differences in ability
- Gender-based differences in aptitude
- Lack of role models
- Workplace environment
- Other

23.3 Do you think there is a gender gap regarding compensation or promotions in the science and technology fields?     Yes  No

If yes, in what area(s) (mark all that apply)

- Hiring
- Promotion to managerial positions
- Promotions and pay raises
- Allocation of research and development funds
- Sponsorship/support for research and development
- Evaluation of achievements
- Assignment of office chores
- Opportunities for further study/sabbatical domestically and abroad
- Opportunities for presentation/self-promotion
- Training opportunities
- Other



24. What do you think is needed in future for women to participate fully in the science and technology fields?

Mark all that apply.

- Improve the workplace environment
- Improve gender-equality systems
- Improve current evaluation systems
- Strengthen social security/pension systems
- Improve the understanding/cooperation of supervisors
- Establish a time-limited period of affirmative action for women
- Abolish job-related age limits
- Increase opportunities for women researchers to network
- Change in women's mindset
- Change in men's mindset
- Allow married couples to retain their original surnames
- Women should balance family and careers
- Men should balance family and careers
- Introduce system of limited-term positions
- Improve system of limited-term positions
- Abolish system of limited-term positions
- No particular measures required



# Number of Respondents in each Academic Fields

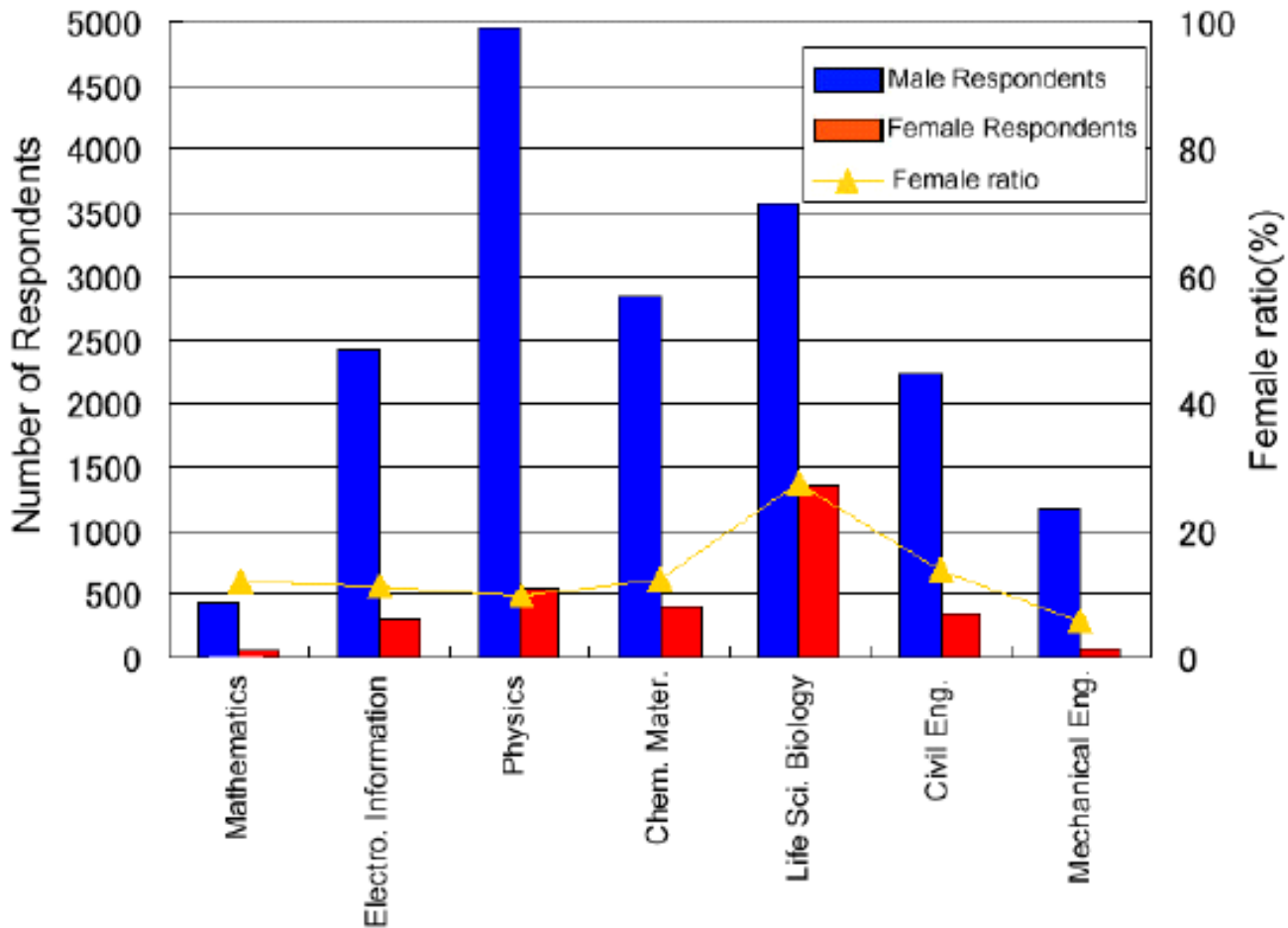
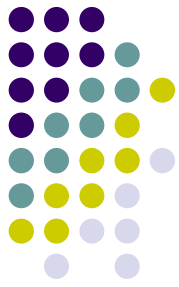


Fig. 2.2 Number of respondents by gender and percentage of female respondents in each academic field



# Organizations of Respondents

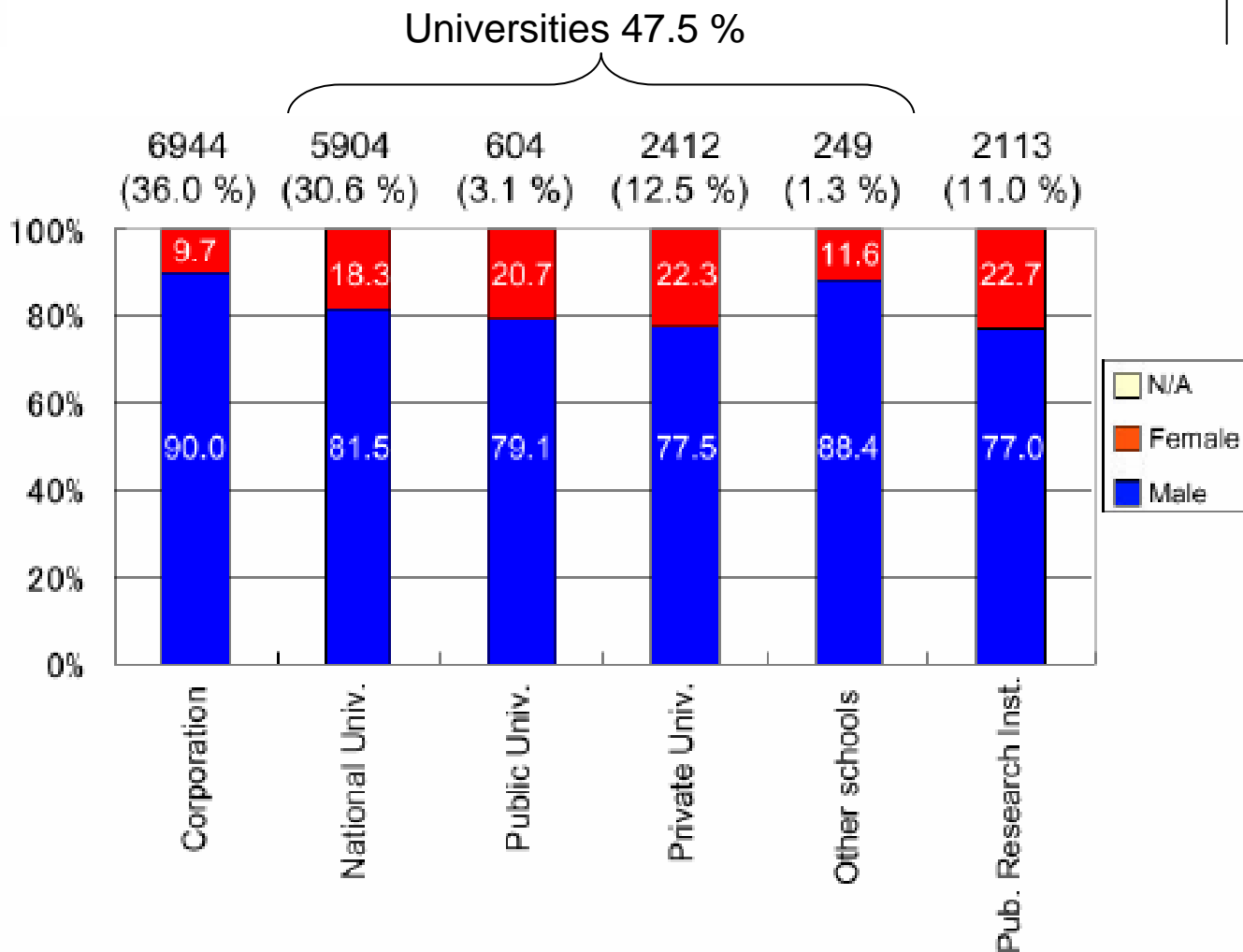


Fig. 2.3 Number of respondents by main affiliation and gender ratio



# Age Distribution

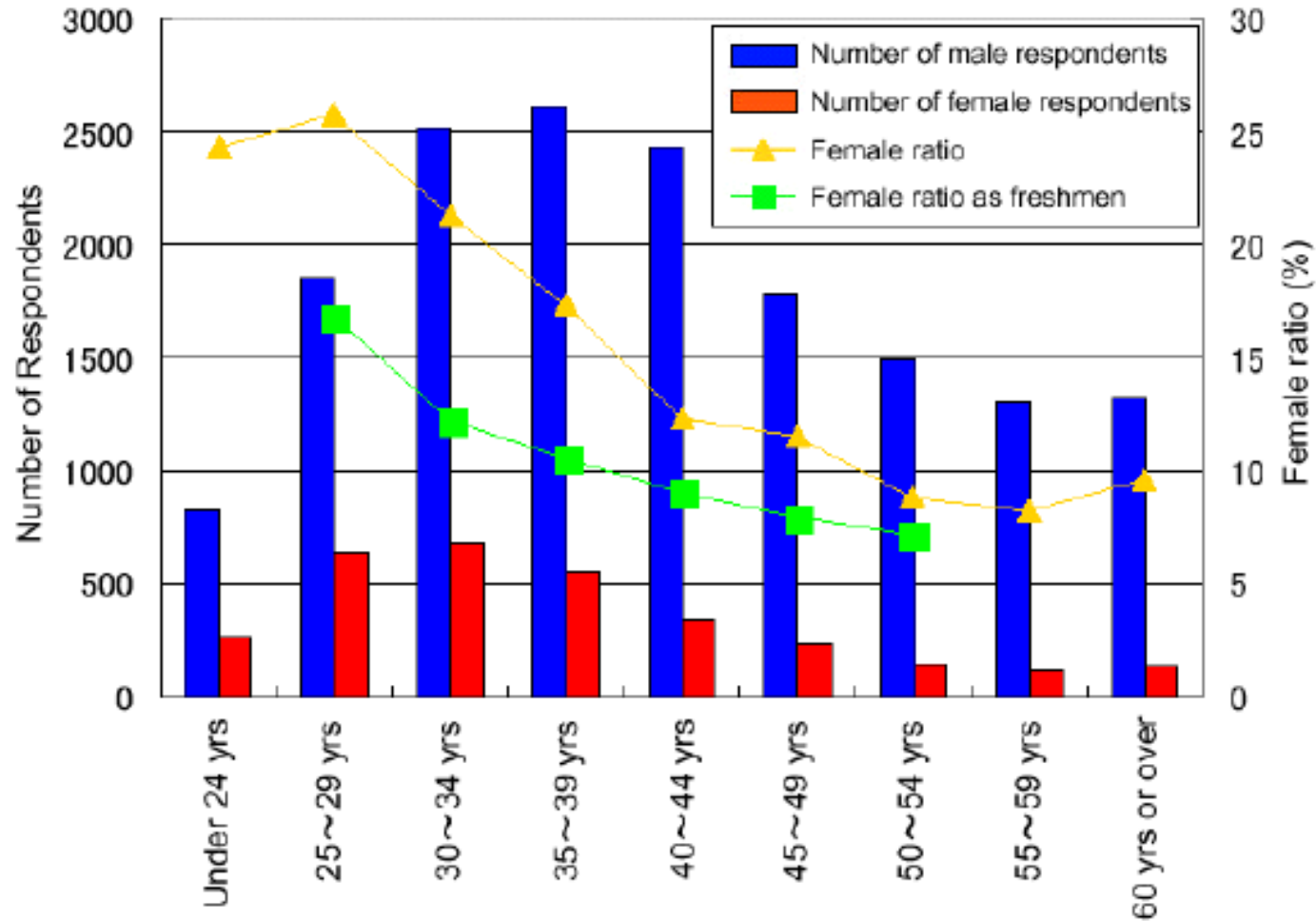
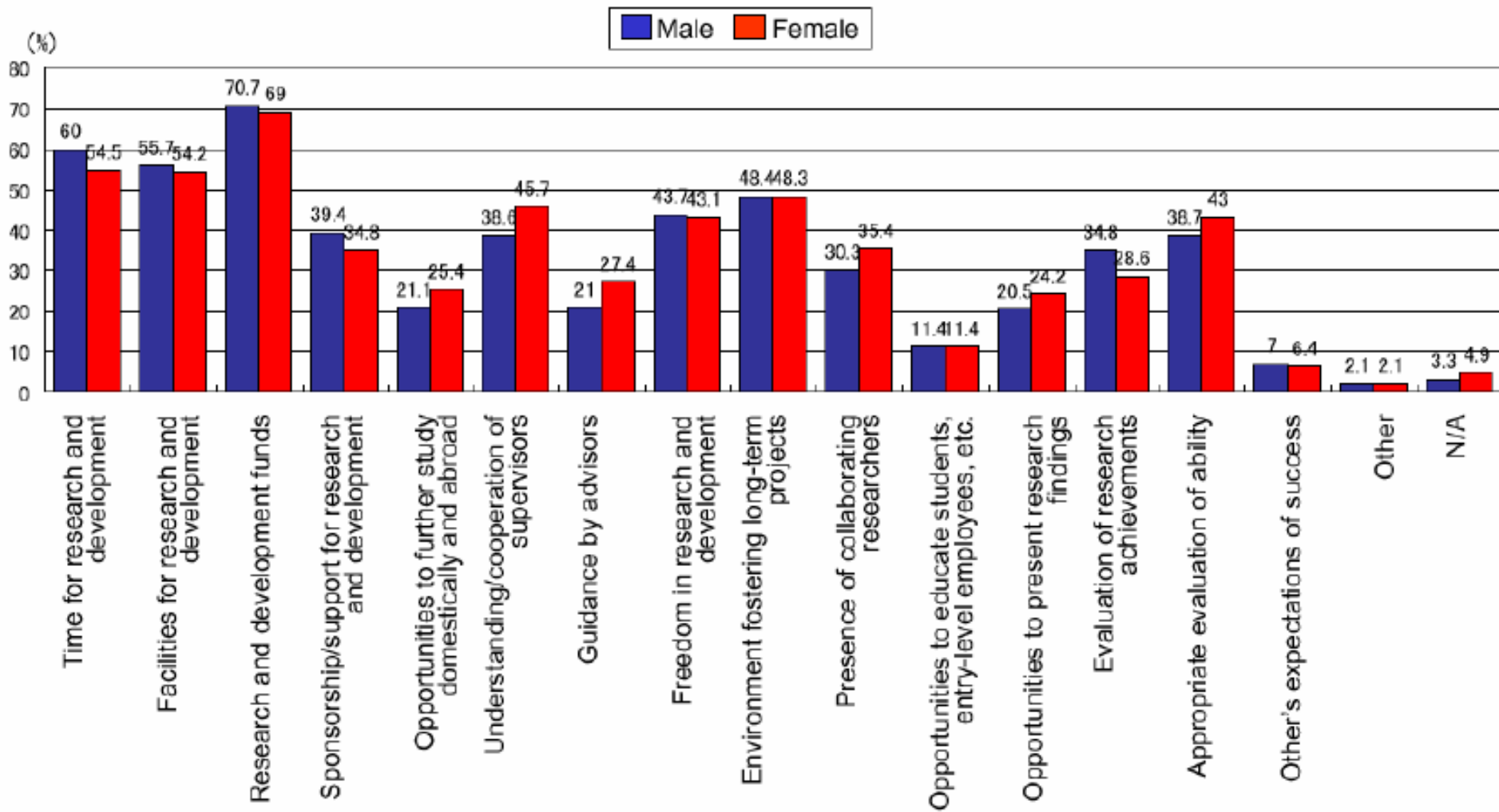


Fig. 2.5 Age distribution of respondents and percentage of female respondents



# Environments/Opportunities Necessary for R&D





# Number of Children

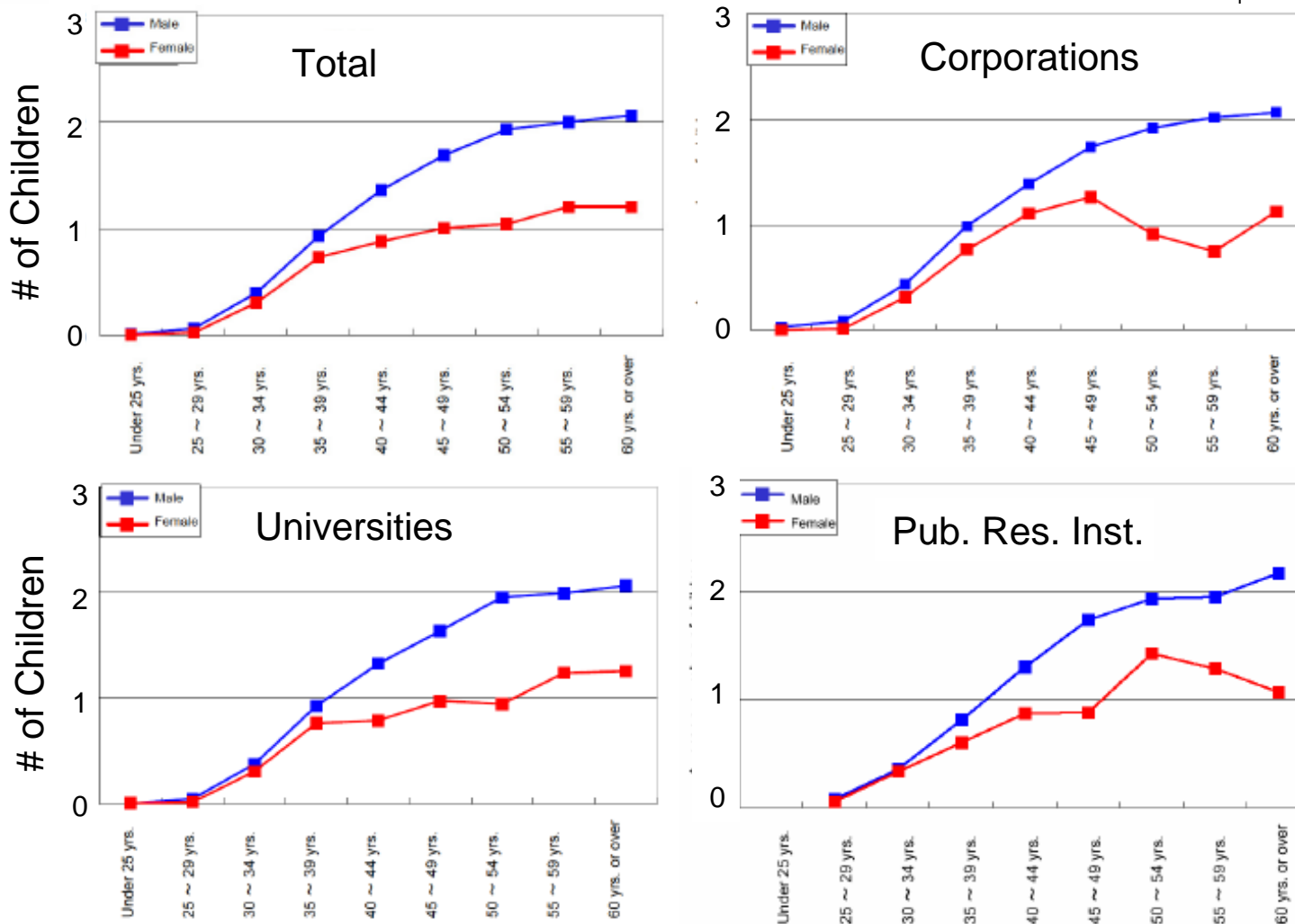
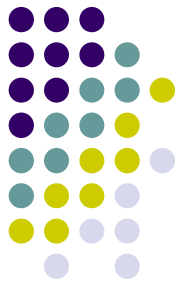


Fig. 2.13 Average number of children by age group for each type of affiliated organization



# Job Positions and Female Ratio



Corporations

Universities

Public Res. Inst.

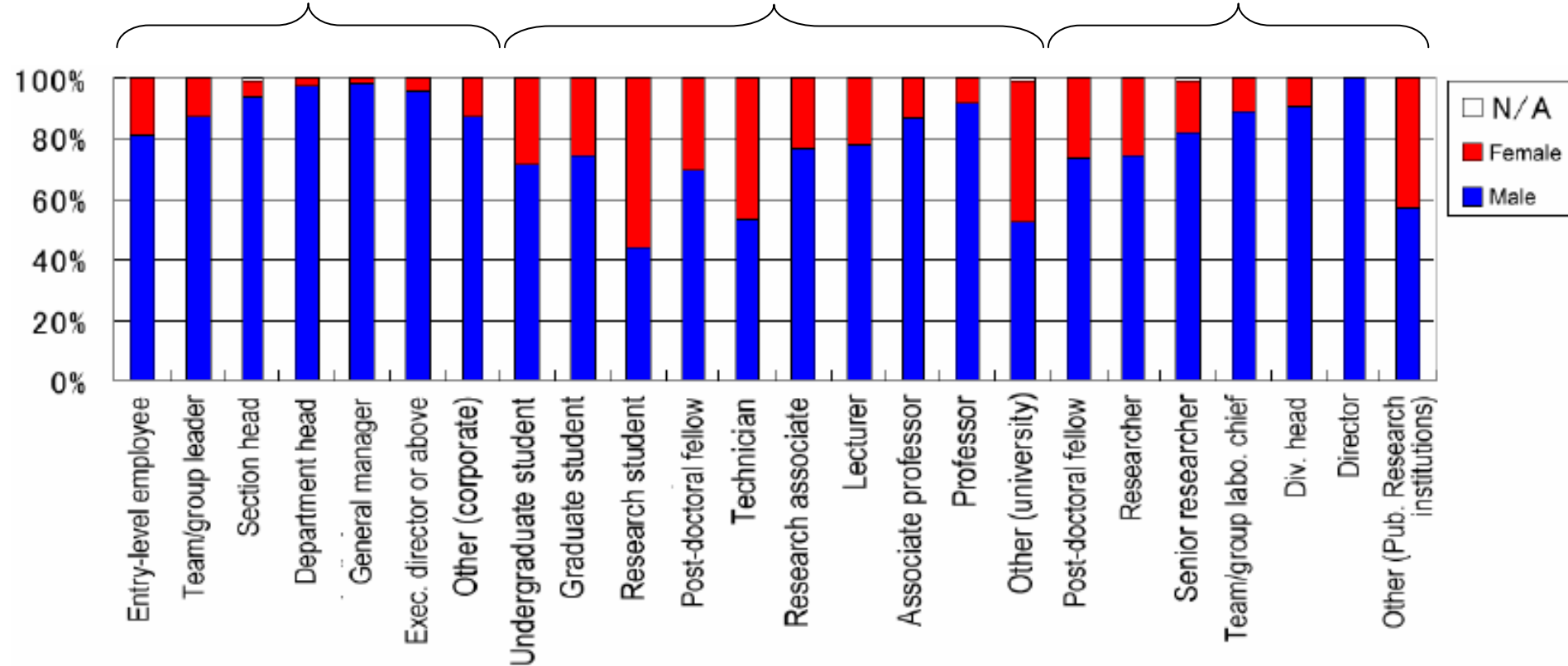
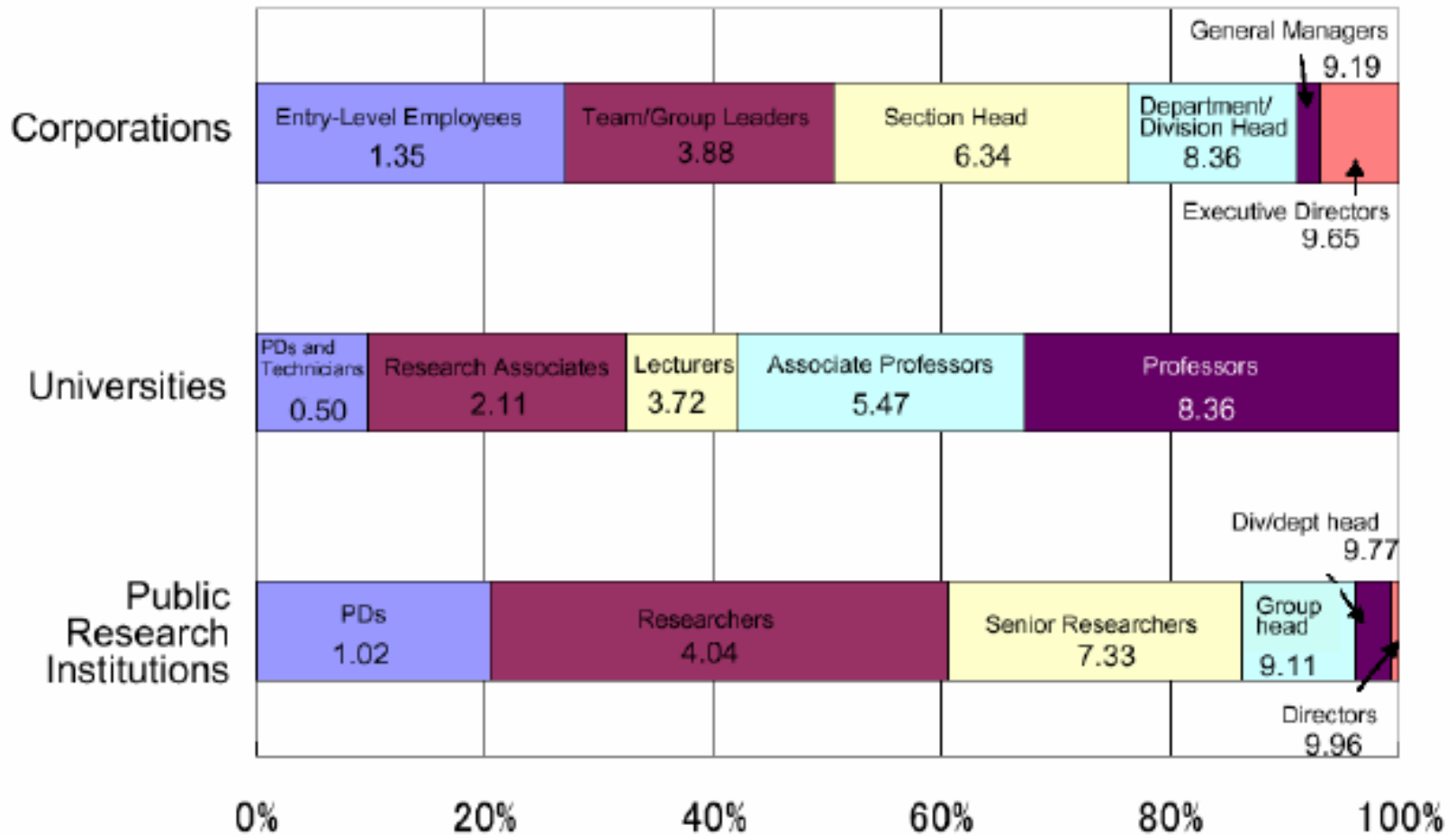
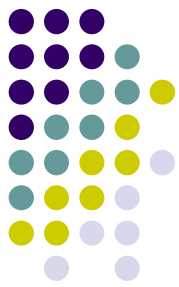


Fig. 2.19 Gender ratio for each position



# Quantitative Analysis using Job Position Index



**Fig. 2.60** Definition of job position index





# JPI vs. Age (for each Organization)

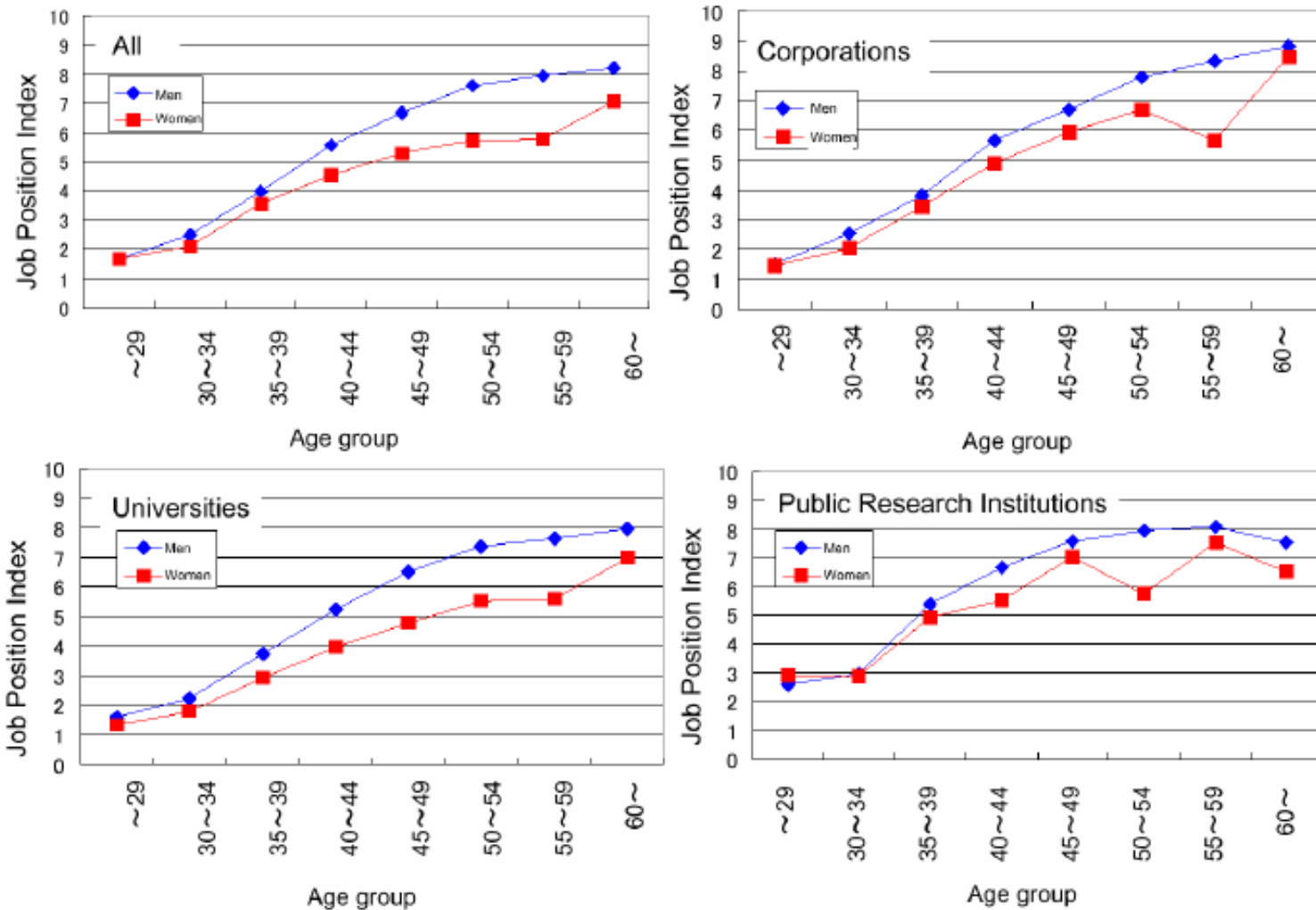
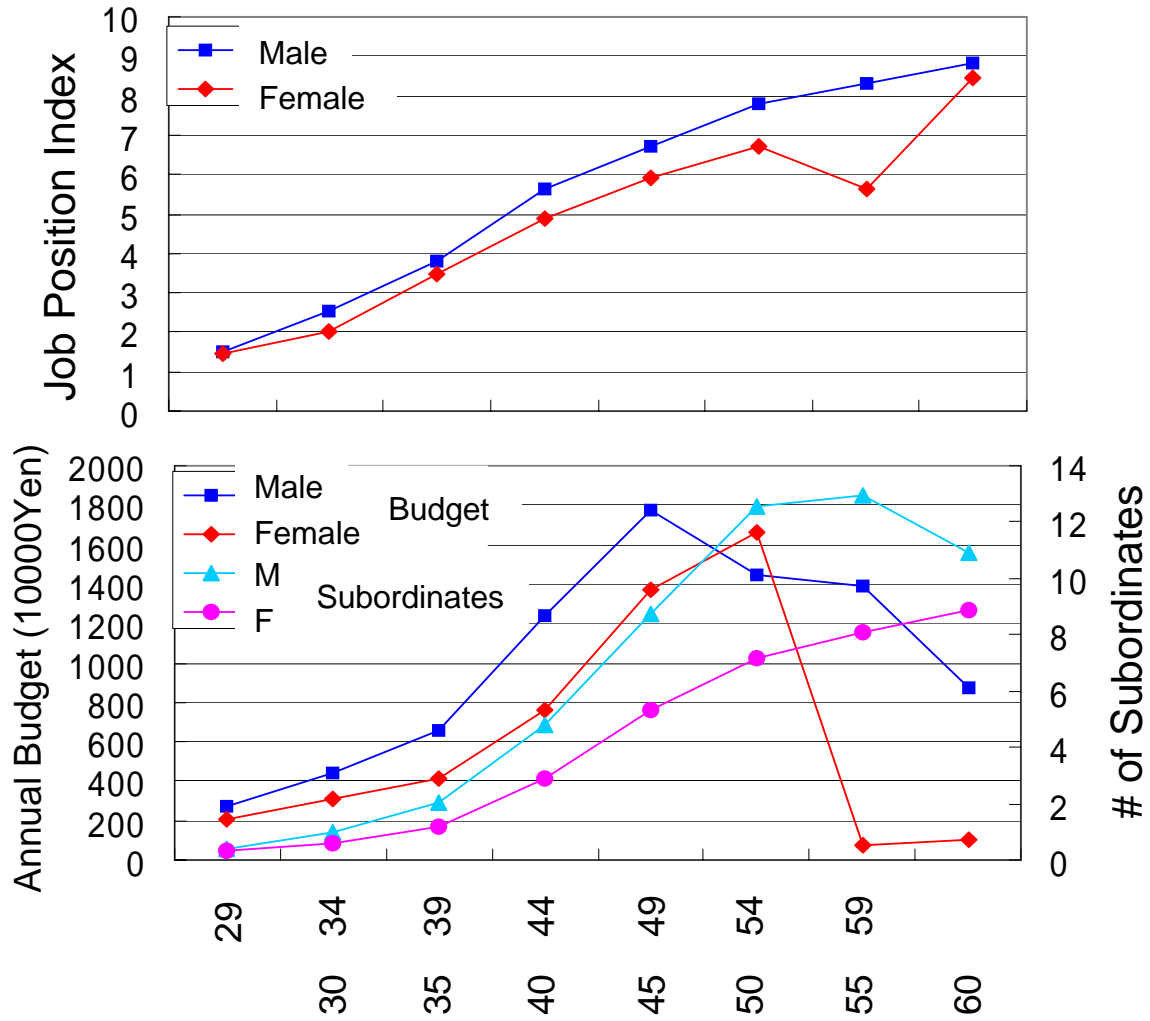


Fig. 2.61 Job position index by gender and age group for each type of affiliated organization

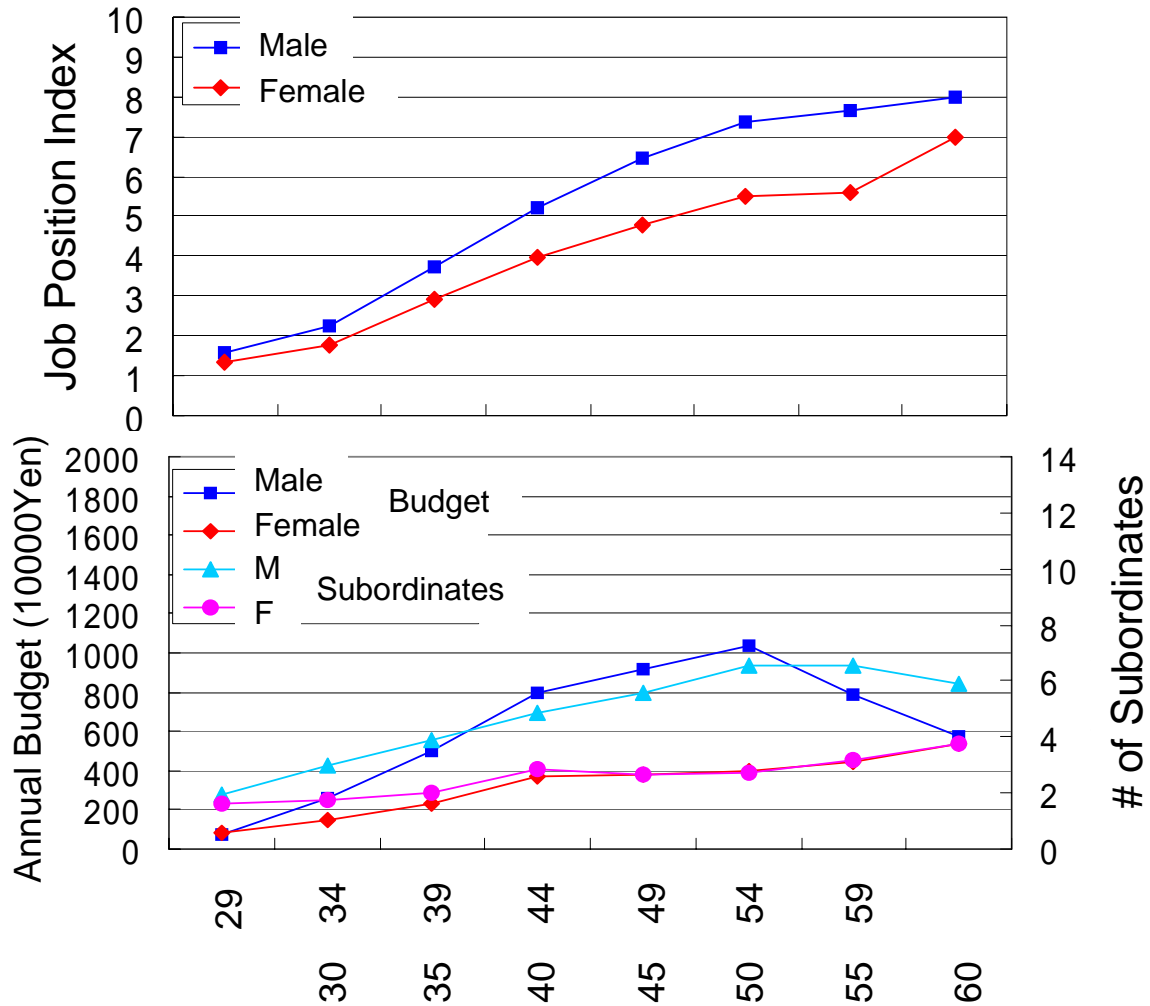
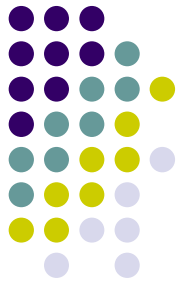


# JPI and Annual Budget / # of Subordinate (Corporations)



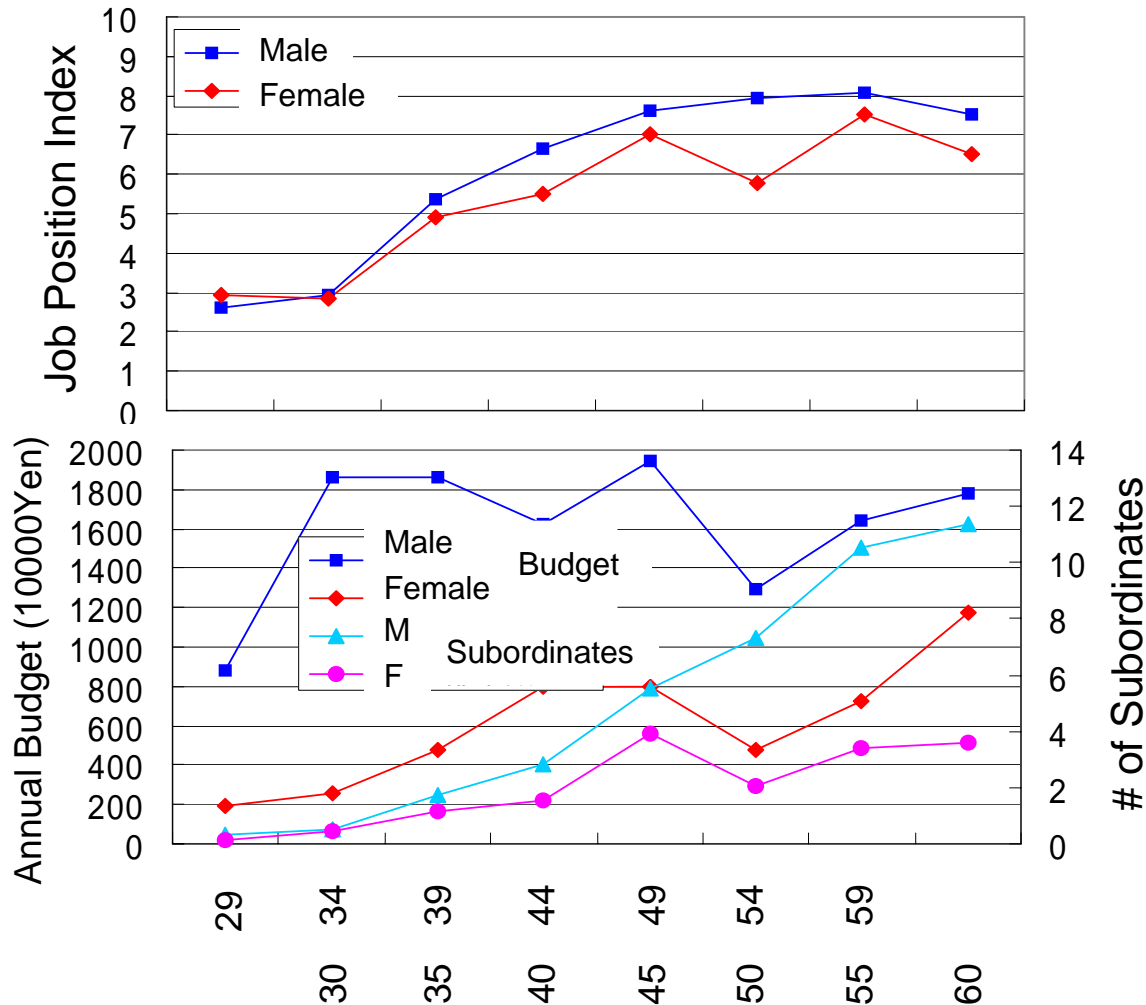
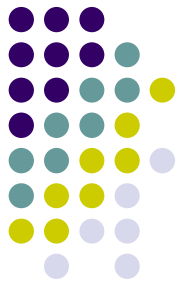


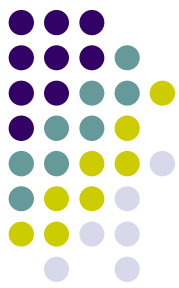
# JPI and Annual Budget / # of Subordinate (Universities)





# JPI and Annual Budget / # of Subordinate (Pub. Res. Inst.)





# Working Hours per Week

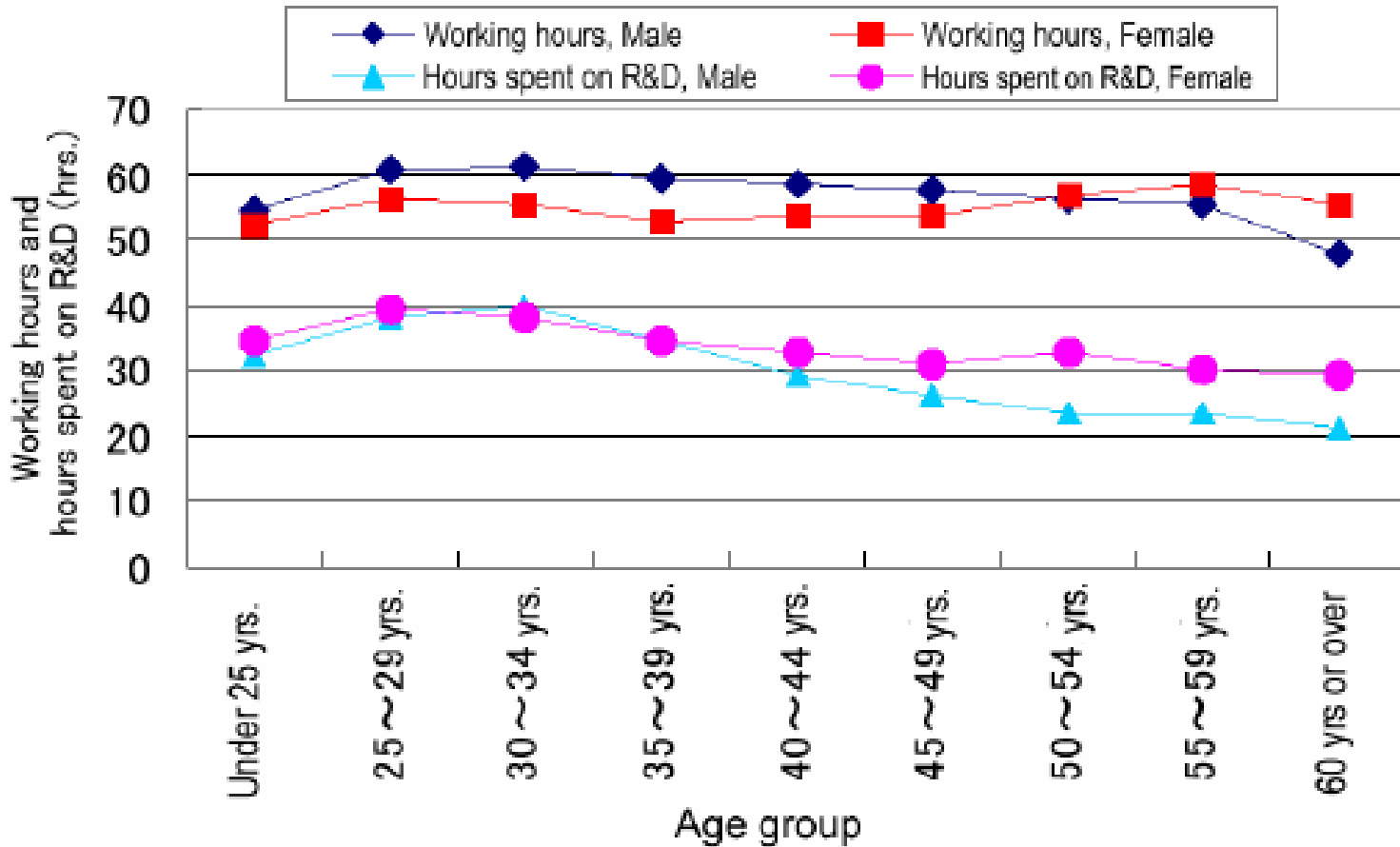
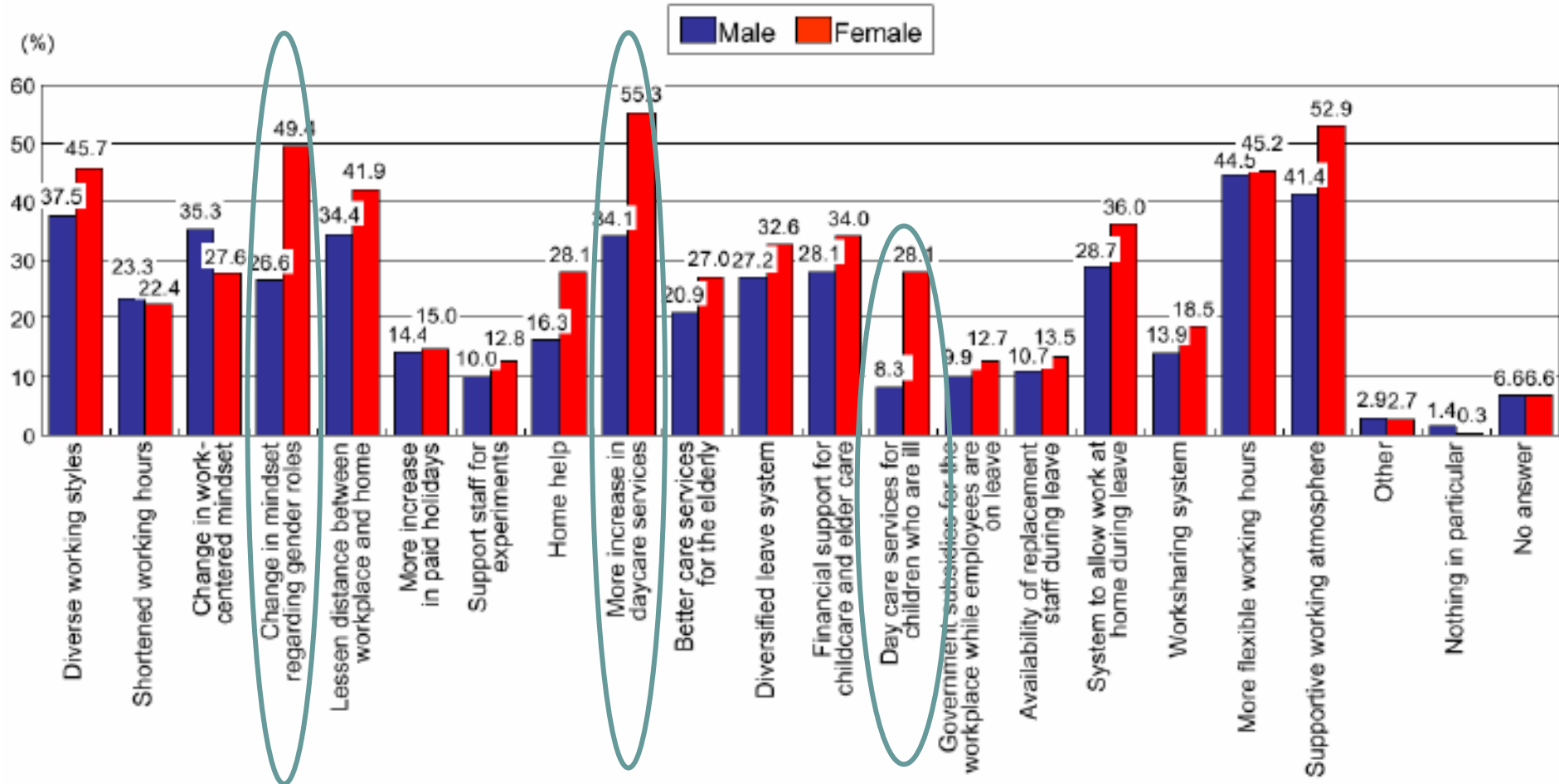
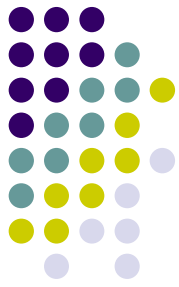


Fig. 2.22 Hours at work and hours spent on research and development by age group

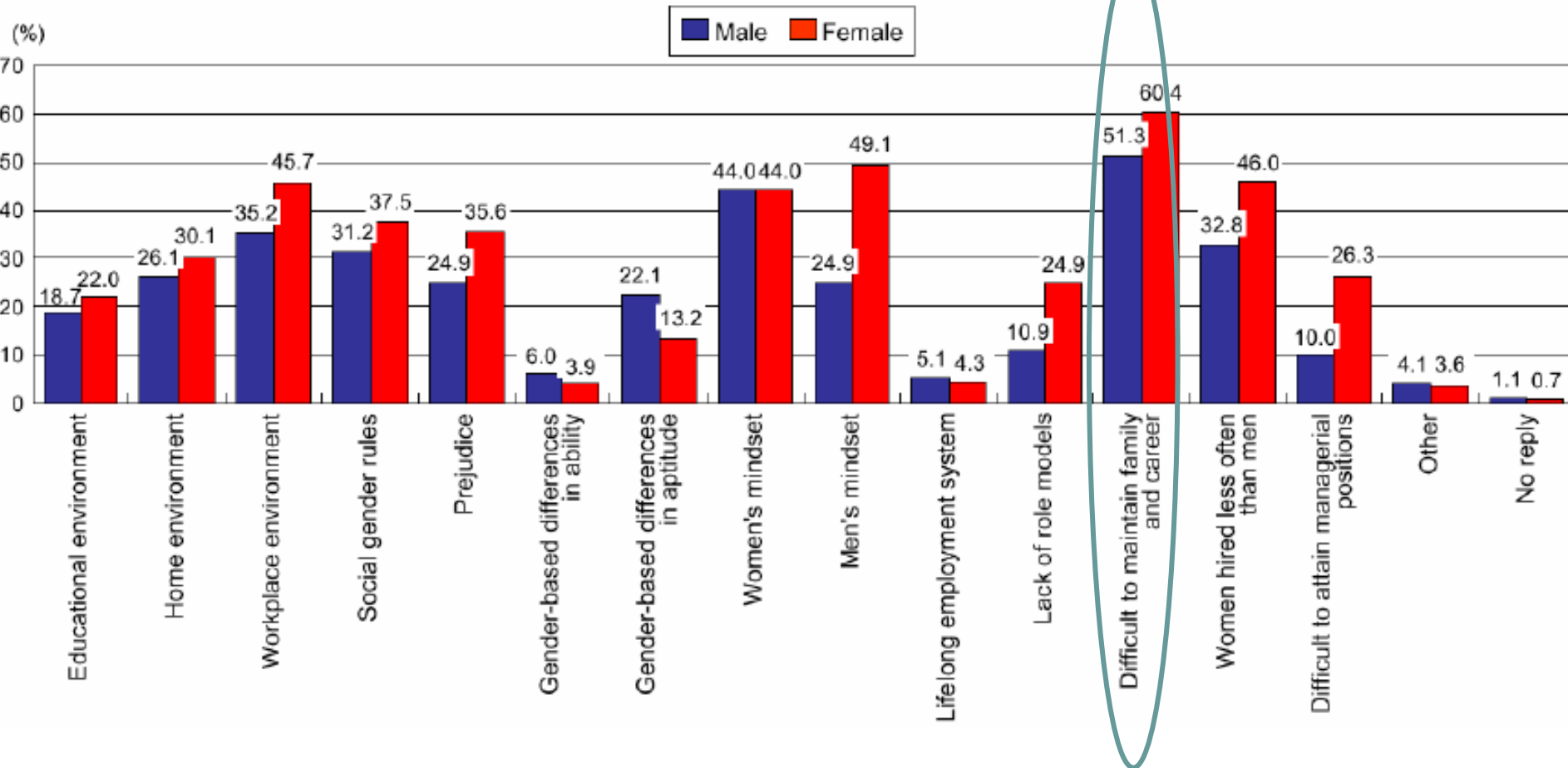
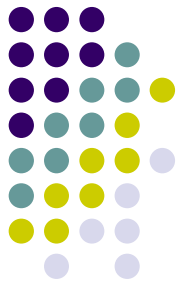


# Factors Necessary for Work/Life Balancing



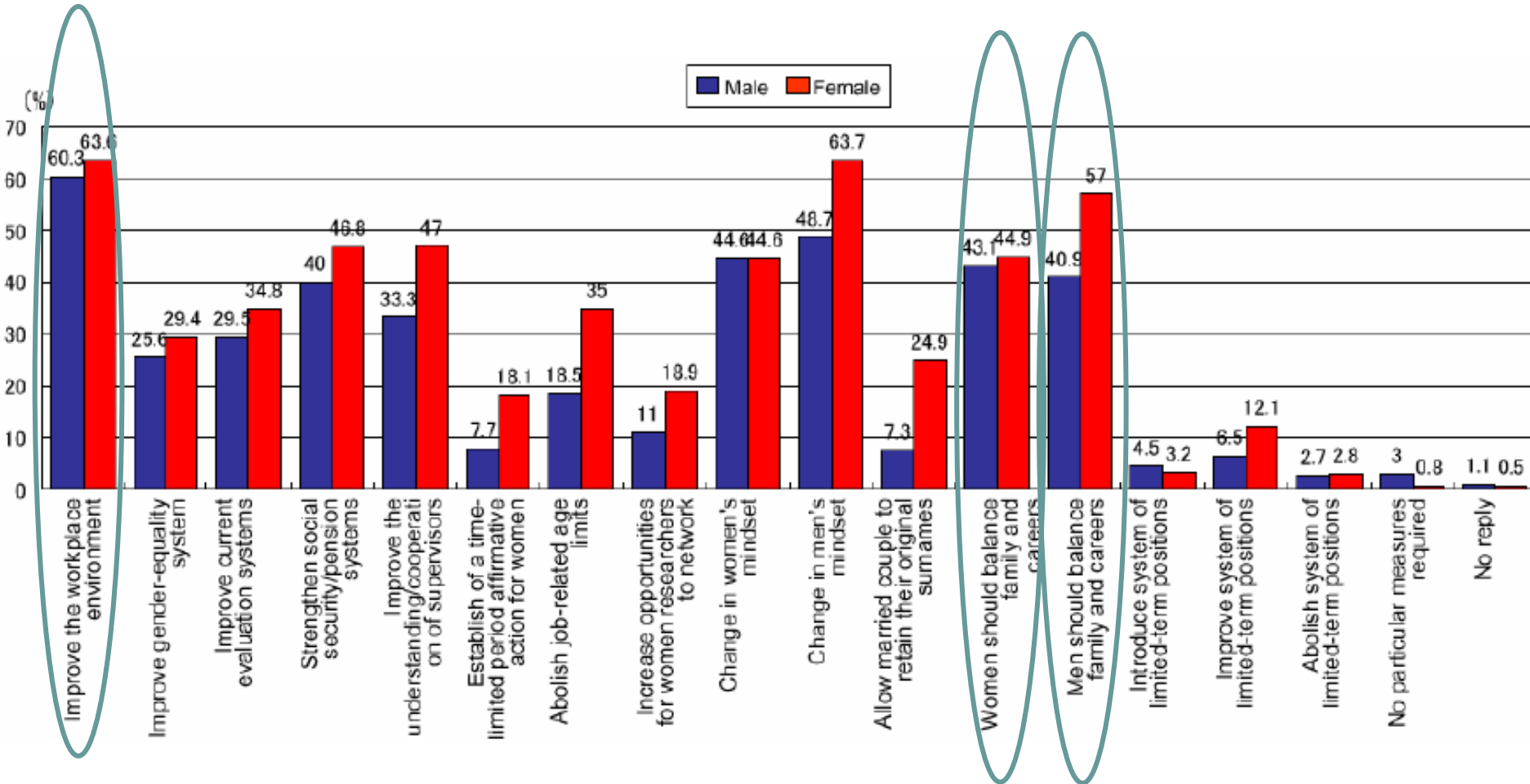
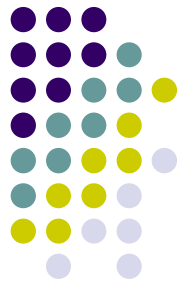


# Barriers for Female Researchers/Engineers





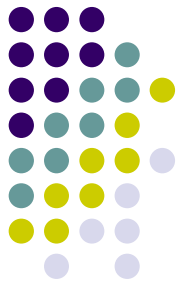
# Ways to Promote Gender Equality







# Summary



- Wide gender gap in the field of S&T in Japan
  - Delay in Promotion (especially, in universities)
  - Wider Gap in R&D Resource Allocations
- Gender gap as a consequence of long-standing fixed gender role in Japanese society
- We proposed actions on R&D funding and support for childrearing based on the survey data.