

## **Cognitive Ability:** The Differences between Males and Females *PY228 Interpersonal Psychology*

### **PART I: What is cognitive ability?**

#### **1. What is cognitive ability?**

- Cognition has to do with **how a person understands and acts in the world.**
- Cognitive abilities are **brain-based skills** we need to carry out any task from the simplest to the most complex.
- Cognitive Abilities have more to do with the mechanisms of how we learn, remember, problem-solve, and pay attention rather than with any actual knowledge.
- **The Example of how we using cognitive abilities:** answering the telephone involves at least:
  - Perception hearing the ring tone                      Decision taking answering or not
  - Motor skill lifting the receiver
  - Language (Verbal) skills talking and understanding language
  - Social skills interpreting tone of voice and interacting properly with another human being.

#### **2. What are the factors that affect the cognitive ability?**

**There are two factors**

- **Biological factor**
  - Factor that affects the function and behavior of a living organism. Internally, this factor can be a **physical (sex)\***, physiological, chemical, neurological, or genetic condition which causes a psychological effect.
- **Environmental factor**
  - Factor that affects the function and behavior of a living organism externally.

### **PART II: Cognitive Abilities among Genders**

#### **1. Verbal Ability**

- **Verbal ability** is a skill to understand and correspond adequately with **words.**
- **Verbal ability** can be measured by testing these areas: vocabulary, analogies, reading comprehension, speech production, essay writing and anagrams.
- *Hyde, Janet Shibley; Linn, Marcia C. (1998):* Analysis of 165 studies (representing the testing of 1,418,899 subjects) that reported data on gender differences in verbal ability indicated **a slight female superiority in performance.**
- However, **the difference is so small** that it appears that gender differences in verbal ability no longer exist.

## 2. Spatial Ability

- **Spatial ability** is probably a collection of competencies subsumed under the single title because of their common reference to the visual-spatial domain.
- It is measured by a variety of tests requiring: imagine the rotation of a depicted object, the folding of a pattern, relative changes in the position of objects, recognize specified shapes when these are embedded in a more complex array, read a map, solve a maze problem etc.
- More than 50 years of psychological testing and research have yielded the consensus that the most persistent of individual differences on multifactor tests of psychological functioning is a sex difference in spatial ability. **Males have decidedly better spatial skill than females.** (*Harris 1978,p. 405; Maccoby and Jacklin1974; McGee 1979, 1982; Wittigand Petersen 1979.*)

## 3. Mathematical Ability

- In some societies, is gendered. That is, many people believe that boys and men are better at math than girls and women and, further, that this difference is biological.
- There is no difference in math aptitude before age 7.
- Starting in adolescence, some differences appear: **boys score approximately 30-35 points higher than girls** on the math portion of the SAT.
- **When boys do better, they are usually also doing worse:** boys are also more likely than girls to get nearly all the answers wrong. So they overpopulate both tails of the bell curve; boys are both better, and worse, than girls at math.
- **Note:** That means that how we test for math ability is **a political choice**. If you report who is best at math, the answer is boys. If you report average math ability, it's about the same.
- It turns out those scores do not predict math performance in classes. Girls frequently outperform boys in the classroom.
- Finding that boys outperform girls within a country does not mean that boys outperform girls across all countries.

## 4. Memory Ability

- A nationally stratified sample of 1,279 children and adolescents, 637 males and 642 females, ranging in age between 5 and 19 years, were assessed on the 14 subtests of the Test of Memory and Learning (TOMAL).
- After controlling for any overall memory effects, **females scored higher on two verbal subtests: Word Selective Reminding and Object Recall, and males scored higher on the Memory for Location and Abstract Visual Memory subtests, the key spatial memory tasks.**

- *Association for Psychological Science (2008)*: significant sex differences in episodic memory, a type of long-term memory based on personal experiences, **favoring women**. While the probability of genetically-based differences between the quality of male and female memory remains unknown, the results suggest that females currently hold the advantage in episodic memory.
- *Wang (2013)*: compared with men, the women in the study recorded more event details initially and then recalled more details more accurately about the remembered events a week later, even after controlling for the additional detail women originally encoded. And while the men and women in the study recorded similar event content initially, at recall, the women reported their experiences by focusing more on relationships and social interactions than men.

## 5. Motor Ability

- Motor skills are classified into two categories:
  - **Gross motor skills** use large muscles for continuous tasks.
  - **Fine motor skills** use the smaller muscles for more accurate tasks.
- *Middle East Journal of Rehabilitation and Health. (2014)*: Results of the current study showed that at preschool stage...
  - Girls had higher performance compared to boys in fine motor skills.
  - In gross motor skills, there's no significant difference between genders.

## PART III: Applications and Conclusion

| Ability     | Males           | Females         |
|-------------|-----------------|-----------------|
| Verbal      |                 | Slightly Better |
| Spatial     | Better          |                 |
| Mathematics | Slightly Better |                 |
| Memory      |                 | Better          |
| Motor       |                 | Fine Motor      |

## 2. Application: Cognitive Abilities and Careers

| Ability     | Example Subjects                        | Example Careers            |
|-------------|---|----------------------------|
| Verbal      | Languages                               | Writer                     |
| Mathematics | Mathematics                             | Mathematician Statistician |
| Spatial     | Physics Mathematics                     | Engineering Architecture   |
| Memory      | Subjects requiring lots of memorization | Secretary                  |
| Fine Motor  |   | Dentists Nurse             |
| Gross Motor |   | Athlete Constructor        |

**10 MOST MALE-DOMINATED OCCUPATIONS IN THE U.S.<sup>12</sup>**

| Occupation  | Total Number of People in Occupation | Share of Women Employees |
|---|--------------------------------------|--------------------------|
| Brickmasons, Blockmasons, and Stonemasons                                       | 162,000                              | 0.1%                     |
| Cement Masons, Concrete Finishers, and Terrazzo Workers                         | 88,000                               | 0.3%                     |
| Electrical Power Line Installers and Repairers                                  | 124,000                              | 0.4%                     |
| Carpet, Floor, and Tile Installers and Finishers                                | 209,000                              | 0.5%                     |
| Heating, Air Conditioning, Refrigeration Mechanics and Installers               | 392,000                              | 0.6%                     |
| Structure Iron and Rebar Workers  | 59,000                               | 0.6%                     |
| Bus and Truck Mechanics and Diesel Engine Specialists                           | 339,000                              | 0.7%                     |
| Miscellaneous Vehicle and Mobile Equipment Mechanics, Installers, and Repairers | 99,000                               | 0.8%                     |
| Tool and Die Makers   | 68,000                               | 0.9%                     |
| Roofers   | 214,000                              | 1.0%                     |

**TEN MOST PREVALENT OCCUPATIONS FOR EMPLOYED WOMEN IN THE U.S., 2010<sup>14</sup>**

| Occupation                                   | Total Number of People in Occupation | Women's Share of Occupation |
|--|--------------------------------------|-----------------------------|
| Secretaries and Administrative Assistants    | 3,082,000                            | 96.1%                       |
| Childcare Workers                            | 1,247,000                            | 94.7%                       |
| Receptionists and Information Clerks         | 1,281,000                            | 92.7%                       |
| Teacher Assistants                           | 966,000                              | 92.4%                       |
| Registered Nurses                            | 2,843,000                            | 91.1%                       |
| Bookkeeping, Accounting, and Auditing Clerks | 1,297,000                            | 90.9%                       |
| Maids and Housekeeping Cleaners              | 1,407,000                            | 89.0%                       |
| Nursing, Psychiatric, and Home Health Aides  | 1,928,000                            | 88.2%                       |
| Personal and Home Care Aides                 | 973,000                              | 86.1%                       |
| Office Clerks, General                       | 994,000                              | 84.2%                       |

- However, we cannot conclude that males and females placed in the careers according to cognitive abilities...
  - Cognitive ability is NOT the only factor determined the choice of careers.
  - Variations of cognitive ability among the same gender are significant.
  - Cognitive ability can be developed.

### 3. Application: 8 Ways to improve Cognitive Ability

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|-----------------------------|---------------------------|
| 1. Physical Activity        | 2. Openness to Experience |
| 3. Curiosity and Creativity | 4. Social Connections     |
| 5. Mindfulness Meditation   | 6. Brain-Training Games   |
| 7. Get Enough Sleep         | 8. Reduce Chronic Stress  |

### 4. Conclusion: Are males and females really differences in cognitive abilities?

- The differences exist but NOT significant!
  - Variations of cognitive ability among the same gender are significant.
  - Cognitive ability can be developed.
  - Since they can be developed, each of gender tends to focus on developing advantage abilities. This contributes to a larger difference.
    - Examples: Parents encourage boys to sports, physical activities. Encourages girl to handcrafting activities.

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