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**Neuroethics of sex/gender:
The "male/female brain" discourse
and sex/gender in our society**

"Brain Science and Ethics"
At the Florey Institute in Melbourne
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1. Introduction

- Sex differences in the brain are one of the most popular topics in recent situations of neuro-hype.
- Popular books on the “male/female brain”
 - emphasize that we need to accept that men and women are entirely different if we would like to live together harmoniously.
 - turn on neuroscientific studies to derive suggestions on how to make our life and relationships better.
- a careless appeal to neuroscientific knowledge might encourage sexism.
 - Some researchers have proposed the need for ethical considerations about neuroscience of sex (Wolpe 2004; Chalfin et al. 2008).

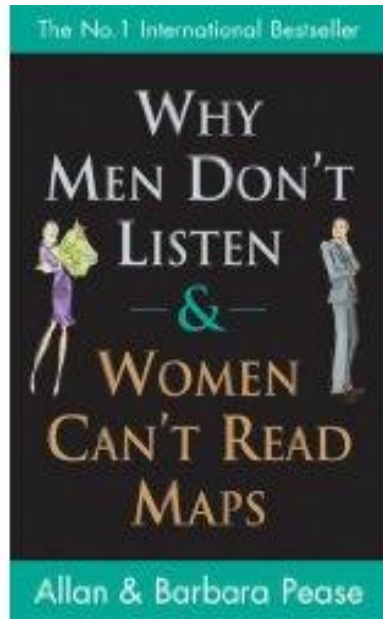
1. Introduction

- When we think about whether we should treat a person according to one's sex or gender, we cannot ignore the extent of actual differences between sexes.
- Yet from neuroscientific findings on sex differences, is it possible to draw some conclusions about how to treat sex in our society?
- In this presentation I will...
 - examine how popular discourse derives suggestions on social lives from neuroscience of sex and show problems in such discourse.
 - consider how we should treat neuroscientific knowledge about sex when we face social problems.

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2.1. The best-selling book *Why men don't listen and women can't read maps*



Pease, A., and B. Pease. 2001. *Why men don't listen and women can't read maps: How we're different and what to do about it*. London: Orion Books.

- In popular books, magazines or TV programs, discourses on sex differences in the brain gain much attention.
 - often contain the claim that there are fundamental sex differences in the brain.
 - Hereafter **the “male/female brain” discourse**.
 - What are its messages and suggestions?
- I will focus on a worldwide best-selling book *Why men don't listen and women can't read maps: How we're different and what to do about it*. (WMW).

2.1. The best-selling book *Why men don't listen and women can't read maps*

- the main points of WMW
 - recent neuroscientific studies prove that there are clear sex differences in our brain and that such differences produce male-female differences in thought, behavior, preference etc. These differences cannot be explicated by social influences.
 - Research shows that we are more a product of our biology than the victims of social stereotypes. We are different because our brain is wired differently. This causes us to perceive the world in different ways and have different values and priorities. Not better or worse – different. (Pease and Pease 2001, 10)

2.1. The best-selling book *Why men don't listen and women can't read maps*

- for a better social life, it is crucial to recognize male-female differences appropriately.
 - Any concept that insists on sexual uniformity is fraught with danger because it demands the same behavior from both men and women, who have quite different brain circuitry. [...]
- [W]hen you understand the origins of these differences, you not only find it easy to live with them, you can manage, appreciate, and end up cherishing them too. (ibid., 285)

These claims sound adequate to some extent.

2.1. The best-selling book *Why men don't listen and women can't read maps*

- central topics
 - women's corpus callosum (a bundle of nerve fibers which connect left and right brain hemispheres) is thicker than men's.
 - thought to bring about the difference in speed and smoothness with which information is exchanged between two hemispheres.
 - producing various male-female differences in abilities or behavioral tendencies.
 - women can do several unrelated things at once, because women use both sides of the brain at once. The "female brain" is good at performing multiple tasks.
 - men's brain is more compartmentalized because of fewer connections between hemispheres. Thus men are good at concentrating on one thing and poor at multiple tasks.
 - (ibid., 54-55).
 - development or function between left and right brains
 - Men have a specific area for a spatial ability in the right hemisphere, although women do not.
 - When speaking, women use both sides of the brain and men uses only the left side.
 - men excel women in spatial abilities, women excel men in the verbal abilities.
 - men talk briefly and logically, while women are talkative and can grasp several topics at once

2.1. The best-selling book *Why men don't listen and women can't read maps*

- a general pattern: men are goal-directed and logical, women are emotional
 - Men are interested in material things while women are interested in humans and relationships.
 - Men value solutions, but women value harmony and cooperation (ibid., 140-48).
- Evolutionary explanation
 - Men did hunting, so a spatial ability or goal-directing style of thinking was needed.
 - Women did gathering and child-bearing, so they had to care about situations nearby so as to detect danger, and be sensitive to small changes of children and companies.
 - sex differences in the brain were formed through evolutionary process and cannot be easily changed by education or some other means .
(ibid., 5, 12-14)
- the secretion of sex hormones during the prenatal period configures the brain to the male/female type.
 - A genetically male fetus (XY) develops special cells which direct large amounts of male hormones through the body. Thus a male testis is formed and the brain is configured for masculine traits and behaviors.
 - With little or no male hormones, a female fetus is not masculinized. The brain is configured with female hormones and becomes "female-wired" .
(ibid., 57-58)
- we can permit each other and establish harmonious relations--if we admit the existence and immutability of sex differences.
- Attention to sex differences in the brain is regarded as helpful in situations like education or choosing one's occupation.

2.2 The “male/female brain” discourse in Japan

- Men and Women are different. their brain structures are different, and their body structures are also different.
Particularly, the fact that their brain structures are different means that men and women see the world through entirely different filters. Their ways of thinking, namely, what they attracted to, what they feel comfortable with, what they protect and so on, are all different. (Himeno 2006, 11)
- Of course some of male-female differences in ways of thinking and behavior are made by social systems. But rather, men and women react and behave differently due to their biological differences, such as ones programmed in our genes or ones formed by the evolution of the brain. (Yoneyama 2003, 8)
- Judging from their systems of cognition in the brain, men and women are never the same kind of the human being. Men cannot understand women and women cannot be convinced by men because their systems of cognition are neurophysiologically different. (Kurokawa 2006, 71)



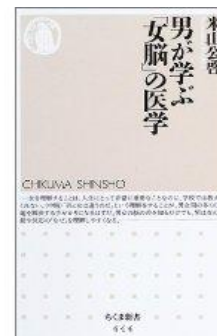
WMW(Japanese Ver.)

2010/7/18

NHK 2009 (DVD)



Yoneyama 2003



Kurokawa 2006



Himeno 2006

2.2 The "male/female brain" discourse in Japan

- In 2009, the Japanese public broadcasting corporation NHK made a series of TV documentary program "Women and men: How latest sciences reveal sex (女と男～最新科学が読み解く性～)".
 - The brain is a major topic in parts 1 and 2
 - mainly consisted of short dramas and interviews with famous researchers abroad.
 - The content is almost in line with WMW and other literatures which emphasize differences in the "male/female brain".
 - This is one of the famous documentary programs of NHK, and its DVD is on sale.

<http://www.nhk.or.jp/special/onair/090112.html>

<http://www.nhk.or.jp/special/onair/090111.html>

文化・芸術・エンターテインメント - Culture・Art・Entertainment -

2009年1月11日(日)午後9時00分～9時48分
総合テレビ

女と男～最新科学が読み解く性～
第1回 惹ひかれあう二人 すれ違う二人

宇宙・科学・テクノロジー 文化・芸術・エンターテインメント

■ 男女はなぜ惹かれあうのか。脳科学は、恋のメカニズムを解明しつつある。その中心はドーパミンという脳内物質。快楽を司るドーパミンの大量分泌が惹きつける二人の絆となっている。ところが脳科学は同時に、皮肉な状況も浮かび上がらせている。高い代謝を要求するドーパミンの大量分泌は身体への負担が大きく、長く続かない。そのため、「恋の賞味期間」はせいぜい3年ほどだというのだ。

そこで、男女関係はどうすれば長続きするのかという科学的な探求がさまざま進められている。アメリカでは30年に及ぶ家族の長期研究を通して、長続きしない男女関係では、男女差が大きな障害になっている事実が浮かび上がってきた。たとえば、女性は、相手の顔の表情から感情を簡単に読み解くが、男性は必死に脳を働かせてもアス。女性が脳を相読すると、話を

文化・芸術・エンターテインメント - Culture・Art・Entertainment -

2009年1月12日(月)午後10時00分～10時48分
総合テレビ

女と男～最新科学が読み解く性～
第2回 何が違う？ なぜ違う？

宇宙・科学・テクノロジー 文化・芸術・エンターテインメント

■ 男女平等の国・アメリカで新たな「男女区別」がはじまっている。小学校や中学校の義務教育現場で、男女別授業を行う学校が増えているのだ。既長期には特に男女の差＝性差が出る。そこで、それぞれの性に合った教育をしようという試みなのだ。また、医学の分野でも、病気の男女の違いを重視する動きが広まっている。

そうした動きの背景にあるのは、いま新たな男女差が次々と見つかったことだ。特に、脳は性ホルモンなどの影響で性差が生まれていることが最近になってはっきりしてきた。なぜ脳に男女差があるのか。そのヒントは、「同じことをしていても、脳の使い方が男女で異なっている」ということだ。たとえば、地図をたどっているとき、男性は空間感覚を利用して地図を見るが、女性は記憶や目印を手がかりに地図を見る。つまり、同じことをしていても両者が使っている脳の分野は異なっているのだ。脳が違うのは、「男女それぞれ得意なことが違う」ということなのだ。

2.3 The claim that men and women should live differently

- Arguments for the claim that we should live according to our sexes
 - 1) Cost-effectiveness
 - Sex differences in ability and behavioral tendency are essentially and immutably different, because they are based on brain differences which are formed through evolutionary process.
 - If so, it is reasonable for us to decide our lifestyle and to treat others according to one's sex of the brain.
 - Women excel in the creative areas such as performing arts, teaching, human resources and literature, all fields where abstract reasoning is not paramount. While men play chess, women dance and decorate. (Pease and Pease 2001, 129)
 - Learning and practicing how maps work can greatly increase your practical ability to use them, just as daily practice on the piano makes for more competent playing. Unless the player has the kind of brain circuitry that facilitates intuitive playing, however, lots of regular practice is required to maintain a reasonable level. Unless the piano player or map reader keeps that up, their skill level will diminish more quickly and take longer to recover than a person whose brain is wired to handle the task. (ibid., 133)

2.3 The claim that men and women should live differently

2) Naturalness

- Lifestyle according to one's sex of the brain is natural or inherent.
 - You can successfully teach a dog to walk on its hindlegs, and if it repeats this behavior regularly, its offspring are also likely to do it too. But it's not a dog's *natural* position and it takes a lot of pain and effort to walk that way. A dog's natural position is on *four* legs. (ibid., 134)

3) A decisive factor of the real desire

- Sex differences in the brain decide our real interests, desires or wishes.
 - [L]ook around and you'll see that in our world of equal opportunity, the women who eclipse men in spatially related pursuits are rare. The main reason is that their brains tell them they're more interested in defending their nests rather than attacking someone else's. (ibid., 129)
 - Men want power, achievement and sex. Women want relationships, stability and love. To feel upset about this is as useful as abusing the sky for raining. (ibid., 285)

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3.1 On scientific validity

1) Corpus callosum

- Whether there is a sex difference in the structure of the corpus callosum is a controversial topic (Fausto-Sterling 2000a, chap. 5). (e.g. The appropriate ways of measurement and analysis)
- Recently there are some studies using a new measurement, yet the existence and the extent of the sex difference in corpus callosum are still under discussion (Halpern et al. 2007, 26-27; Leonard et al. 2008).
- famous lay presses like Newsweek hyped the sex difference in corpus callosum as if it was a well-founded scientific fact (Bishop and Wahlsten 1997, 582).

2) An evolutionary explanation

- "men did hunting while women did gathering and child-bearing": hypothesis gained popularity in the 1960s
- Now objections and counter examples are proposed, including its hidden sexist assumption.
- The recent predominant hypothesis is that early human gained foods mainly by gathering and there was not a major division of labor

3.1 On scientific validity

3) The cause of the brain differences

- Prenatal androgens are indeed a major candidate for the factors that cause sexual differentiation of the brain (Breedlove 1994), but sex differences in the brain and behaviors are also influenced by experiences.
- Factors such as genes, hormones, environments and experiences interact, so they cannot be regarded as entirely separate.

(Breedlove 1994; Halpern et al. 2007)

E.g. it is often claimed that there is a sex difference in our spatial ability and this difference has a biological basis.

One possibility : prenatal hormones affect children's activity. Active children will be in more various environments than inactive ones. Thus, activity can lead to a better spatial ability (Takeuchi 1994).

...suggests that hormonal effects can be indirect, making a causal relation with some other factors.

3.1 On scientific validity

- Sexual differentiation of the brain and its relation to behavior is actively researched in non-human species, particularly rodents (Breedlove 1994; Sakuma 2006).
- But We cannot easily extrapolate findings in animal studies to humans because of their differences in brain structure, behavioral and social complexity and so on. A possible method of study is also different. Studies on humans are ethically and technologically limited (Collear and Hines 1995; Sakuma 2006).

3.1 On scientific validity

- 4) Brain differences and differences in abilities or behaviors
- Differences in brain structures and functions do not necessarily bring about differences in abilities, tendencies or behaviors (Cahill 2006, 478).
 - As for sex differences which appear in a behavioral level, relatively constant differences are found in verbal, spatial, mathematical abilities and aggression (Maccoby and Jacklin 1974), yet it has been pointed out that the differences are marginal compared to individual differences (Hyde 1981; Hyde 1984).
 - Findings about sex differences can be drawn upon in our social life only when thinking about men/women as a group (Halpern 1997, 1008).
- 5) Immutability of differences
- our brain is plastic, and indeed there are some reports that the sex difference in some cognitive ability has been decreased through time (Feingold 1988), or a difference in visual spatial performance is eliminated by short-term training (Kass et al. 1998).

3.1 On scientific validity

6) Where the focus is

- In neuroscientific research, we need to consider sex differences of the brain to know the function or structure of brain regions or to investigate central nervous system disorders which show sex differences in their incidence and/or nature (Cahill 2006).
- In a neuroscientific context, sex differences in the brain are notable primarily to know about the brain itself.
- On the other hand, the “male/female brain” discourse focuses on sex differences in the brain to know about ourselves, or our characters, values and lifestyles.

3.2 On the claim that men and women should live differently

- Even if it turns out that there is an immutable sex difference in our performance of practical activity (for example, calculation or speech), it does not necessarily follow that we should not try to eliminate the sex difference.
 - “Lifestyles decided by sex are cost-effective”
 - cost-effectiveness is not the only value in social life. In some occasions other values such as equality of opportunity might be prior to it.
 - “lifestyles decided according to one's sex are natural”
 - Here, being natural seems to mean that following one's innate inclination. Yet it is not by itself something good or bad, nor something one should do or should not do.
 - “sex differences in the brain decide our real interests, desires or wishes”
 - one's desire can be affected by various factors such as biological factors which do not relate to one's sex, experience or socio-cultural background.
 - It is common that one person has different and contradicting desires at the same time.
 - Thus there is no reason that desires affected by one's biological sex should always be privileged among other desires.

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4.1 Biological sex differences and the gender category in our society

- Although there are exaggeration, simplification and rash judgment in the "male/female brain" discourse , we cannot deny that there are some differences between men and women, and taking them into consideration will be useful when thinking about how we should treat problems in our social life.
 - There is one thing to note, however.
 - In our social life, we often treat a person differently according to whether the person is male or female.
 - This seems to be a natural consequence which follows from the biological difference between male and female. But is it true?
 - biological sex differences
 - made at multiple levels such as a cellular level (e.g. chromosomes), a hormonal level (e.g. hormones in the fetus, during childhood, after puberty) and an anatomical level (genitals, secondary sexual characteristics).
 - At any level the distinction is not completely dimorphic, and distinctions from different standards can characterize one person's sex differently.
- (Fausto-sterling 2000b, 22; Blackless et al. 2000).

4.1 Biological sex differences and the gender category in our society

- Here, the “membership categorization device” (Sacks 1972) in ethnomethodology is suggestive.
 - Harvey Sacks proposed this idea to explicate how people categorize themselves and others in daily activities.
 - has offered an insightful perspective to gender studies (West and Zimmerman 1987; Stokoe 2006; Yamazaki, Yamazaki and Tsuruta 2006; Komiya 2006).
- *The Membership categorization device*
 - a collection of categories and rules of application which we use in everyday life to characterize people. E.g. family (baby, mommy, father) or gender (male, female).
 - enable us to understand various social situations and act in them.
 - “Male” and “female” are categories that can categorize members of any group in society. Each category is linked to some activities, characteristics and other membership categories (e.g. mommy, teacher, physician).
 - A person categorized as “male” is expected to do “male’s” actions, have “male’s” characteristics and categorized to other categories which are tied to “male”.
 - Deviation from this expectation will result in being asked for a reason, or sometimes accusation as unmanly. Even though there is no direct accusation, wondering or disbelieving looks will be directed at. One has to present one’s gender in an apparent feature to be qualified as normal.
(Stokoe 2006,471-75; Komiya 2006)

4.1 Biological sex differences and the gender category in our society

- The point suggested here is that it is presupposed in society that every member is consistently either male or female in every situation.
 - Fundamental features that a member of society has are related to “male” or “female”: e.g., clothes, occupation, and behavior. Maintaining a social life will become so difficult if one cannot be consistently male-like or female-like.
- The “male/female” category in our society
 - prescribes fundamental features of an individual as a member of society. Being categorized as male or female is constitutive of being a member of society.
 - much different from one in biology, which describes bodily or organic features from various viewpoints.
 - The “male/female” categorization in our society is not the same as the biological categorization, and never rationalized by appeal to biology.

4.2 A possible neuroethical problem: Brain treatment of GID?

- There are people who feel serious discomfort with one's sex/gender assigned at birth. Some of them appeal to medical means to ease the suffering. If they meet certain criteria, psychiatrists diagnosed them as Gender Identity Disorder (GID).
- diagnostic criteria for GID in DSM-IV-TR
 - A. A strong and persistent cross-gender identification (not merely a desire for any perceived cultural advantages of being the other sex).
 - B. Persistent discomfort with his or her sex or sense of inappropriateness in the gender role of that sex.
 - C. The disturbance is not concurrent with a physical intersex condition.
 - D. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

(APA 2000, 581)

4.2 A possible neuroethical problem: Brain treatment of GID?

- From a neuroscientific point of view
 - GID is presumed to have a biological factor.
 - supposed to be a discrepancy between sex differentiation of the brain and genital differentiation which occurs during development (Cohen-Kettenis and Gooren 1999, 318-19).
 - A study on the difference in size of the bed nucleus of the stria terminalis (BSTc) (Zhou, Hofman, Gooren and Swaab 1997)
- Medical treatments for GID :psychotherapy, hormonal therapy and surgical treatment (Cohen-Kettenis and Gooren 1999, 325-26; Ishida(ed.) 2008, 13-18).
- If it is made clear that GID is caused by an anomaly in the brain, this will open the possibility of brain treatment of GID.
- A possible claim
 - surgical treatment which includes reconstruction of genitalia damages one's reproductive function in an irreversible way. Besides, this treatment is palliative but does not get rid of the cause of the disorder, i.e, some abnormal states in the brain. Brain treatment is a curative treatment for GID, so this might be the most ideal medical therapy of GID.

4.2 A possible neuroethical problem: Brain treatment of GID?

- What is the normal state which the brain treatment for GID should bring about? Is it being perfectly and consistently "male" or "female"?
- uncomfortable feelings toward assigned sex cannot always be explained in a simple way
 - Some people feel strong discomfort toward the originally assigned sex yet do not identify with the other sex (Diamond and Butterworth 2008; Ishida(ed.) 2008, 7-8).
 - People are directed toward changing one's sex/gender not only by an unpleasant feeling toward one's body. As mentioned before, our social system and everyday social communication are organized in a way which clearly differentiates male and female. Thus people are always exposed to the pressure to be consistently male or female (Tsuruta 2006).
- I do not claim that the wish to change one's sex/gender is formed by social pressures and do not have a biological or neural basis. Yet it might be true that a social situation which presupposes that all members are consistently male or female affects the decision of people with discomfort toward assigned sex.

4.2 A possible neuroethical problem: Brain treatment of GID?

- Situations in Japan
 - People who do not lead a life in a consistently male/female way (e.g., change clothes, behaviors or body) have troubles with social participation, such as obtaining employment.
 - According to the medical standard, legal standard and the difference between them, gaining the male/female feature or social status becomes hard, or nearly impossible, to some people.
 - E.g. hormonal and surgical treatments are not covered by insurance, so financial demands are huge. Even people undergone treatments may not pass criteria for changing gender on census registration, e.g. not having married; not having a child under 20 (Ishida(ed.) 2008 18, 23-24, 26-27).
- It might seem that, if adjusting the brain to male/female becomes possible and covered by insurance, it will be the best.
- However, is it really necessary to demand all members of society to be consistently male/female and to load the burden to people who are not? Is it necessary for our society to be structured in a gendered way? If necessary, in what aspect and to what extent?
- To remove the difficulties of people having trouble with assigned sex, we can aim not only at changing the body or brain but also at changing the society in a less-gendered way. Both possibilities should be kept in mind.

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5. Conclusion: Toward a neuroethics of sex/gender

- we should not ignore neuroscientific findings on sex differences. The important thing is to properly assess the differences.
- Only then we may utilize neuroscientific knowledge in thinking about how we should treat men/women in society. Yet there are many factors that should be taken into consideration.
- The “male/female brain” discourse
 - describes familiar and stereotyped images of men and women as given.
 - This might be the reason people find such a kind of discourse persuasive and attractive.
 - This point suggests that the question “male or female?” matters heavily for many people in various situations. Yet it has to be asked whether our social world really needs gendered structures, and to what extent.
- **The “male/female brain” discourse is not only scientifically invalid. Sex/gender-related problems in our society cannot be solved in a simple way—much more have to be considered.**

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