

## A Conceptual Basis for Gender to Support a Balanced Emancipation of Both Sexes

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### Abstract

That which is considered specifically feminine or masculine is not only related to reproduction but also highly dependent on traditions and personal views. To create order in this chaos a physical theory, called twin physics, is applied to gender. This theory is based upon a mathematical definition of complementarity, through which physical phenomena can be described as entangled appearances of certainty and uncertainty. Twin physics is transformed into a simple version, called the twin model, to describe complementarity in human beings. We added the fact that the two sides of any complementarity in a human being alternate in time, so they go through two stages repeatedly, which is called the switch rule. We suppose that not only biological but also psychological processes are subject to complementarity in the same way. These processes are considered with special attention for gender, to find out to what extent there is a connection between behavior and gender.

The two complementary characters in the context of human life are called the straight image requiring a concentrated use of energy, and the magical image requiring a divergent use of energy. They are expressed in common terms and arranged in diagrams, called word quartets, in which also two negative labels are given, indicating what may happen if a function gets out of balance. Positive means that it is considered to be healthy and useful by yourself or your social surrounding. These ratings, different for each person and situation, indicate what may happen if a function gets out of balance. A strongly gendered upbringing may cause identity problems in young people and might be a major obstacle to developing their talents. Word quartets are useful as a system for estimating on which side an unhealthy process began: on the straight or on the magical side, to find out in which image something is wrong and what should be changed to restore the subject's well-being. A word quartet is applied to the #MeToo movement.

**Keywords:** Human Life; Complementarity, Twin Physics

### Introduction

There is no more profound example of complementarity in human life than the reproductive system, in which the male and the female have distinct tasks which cannot be exchanged. At the same time, this gives rise to a chaotic conception of gender differences apart from reproduction. That which is considered specifically feminine or masculine is highly dependent on the country, the historical period considered and personal views. One

of the reasons for the occurrence of this situation is the lack of a clear understanding of complementarity.

To bring some order to this chaos, we have applied a physical theory called 'twin physics', based upon a complementary view of the universe, to gender. Although twin physics was developed to describe inanimate physical items, all living creatures have a body and so, to some extent, they too are subject to physical laws. The basic difference between animate and inanimate entities is

that living creatures carry out an ongoing variety between two complementary phases in each function. In physical experiments this does not occur; in general an entity persists in one side of a general complementarity. Only reproductive functions are not completely represented in one human being, but distributed between males and females. Asexual reproduction occurs only in certain animals and plants.

The reason for developing twin physics was the impossibility to deal with the surprising results of the first quantum mechanical experiments in 1927 [1], showing that in certain circumstances the laws of Newton could not be applied to tiny elementary particles like electrons.

At the time, the scientific world was convinced that the universe was constructed in a determinate way. This conviction was the result of the huge success in getting control over physical phenomena by using the laws of Newton, arrived at in 1666 and published in 1687. From then on, phenomena which could not be measured, were ignored. Uncertainty was banished and physics became a purely deterministic science; it seemed just a matter of time before the physical world would be completely understood from a scientific point of view.

Things turned out differently than expected. It seemed as if uncertainty played a basic role in the universe instead of being just a practical detail related to measurement inaccuracies. All available mathematical methods were based on the conviction that in the end any physical phenomenon could be exactly described, without any uncertainty. Even probability theory was based on the idea that each separate element of a group of particles behaved strictly determined.

It took several decades before the complementarity between certain and uncertain behavior of matter could be expressed in a mathematical formula, suitable to extend physics according to these experimental results. It wasn't until 1974 when the physicist Max Jammer published a sound mathematical definition of complementarity [2], useful as a basis to reformulate physical descriptions in such a way that the existing laws of physics were respected, adapted or refined. In this definition he stated that two mathematical descriptions are complementary if (1) they are distinct, (2) they refer to the same subject, (3) exclude each other, and (4) each separately cannot describe the subject completely.

Using this definition, it was possible to describe real phenomena as entangled appearances of certainty and uncertainty. Although we used the same starting points as Newton did to describe mass, that is, as points in an empty space, we adapted his idea of an infinite, empty space to many overlapping finite spaces, somewhat like an invisible flow of bubbles. Also we abandoned the idea of point particles which all together were supposed to form masses, because experimental results in the 20th century showed that each elementary mass, however small, occupies some space.

After making these two adjustments, space was supposed to be as important as mass. The only difference between an elementary mass and an elementary space was that an elementary mass has a very high energy density and an elementary space a very low energy density - which will never be zero. To be able to describe elementary space, the usual algebraic methods have been replaced by using set theory in the form of a geometrical method, combining elementary masses and elementary spaces in one single description [3].

By developing the mathematics of twin physics it was possible to involve relativity theory, the law of conservation of energy, the law of conservation of rotational angular moment and the laws of Maxwell. The Heisenberg uncertainty relation is included in a generalized way: if one side of any complementarity dominates an appearance, the other will play a small but indispensable role. For more theoretical information see for instance [4,5].

Applying this theory to a real three-dimensional space and one-dimensional time we obtained twin physics, describing an intermingled occurrence of certainty and uncertainty in all phenomena. With this theory it was possible to describe elementary particles and the forces of nature [6]. Later, four types of electrons were found, making it possible to obtain more insight in nanophysics [4]. Finite magnetic fields of molecular size, connected with two of these electrons, gave new possibilities to deal with magnetic phenomena [7].

We transformed twin physics into a simple model, called the twin model, suitable to describe human behavior. To this purpose we expanded the definition of complementarity, as given above, with the rule that human functions (except reproductive ones) are subject to the switch rule, requiring that in each function a steady, continuous switching between two complementary phases in each function has to take place.

### The biological aspect of gender

We will first consider the most basic biological difference between human females and human males, concerning the reproduction process.

Normally, each cell in the human body has 23 pairs of chromosomes, two by two forming a pair, like for instance a pair of shoes, so each cell has 46 chromosomes in total. Of each pair of chromosomes, one comes from the father and the other from the mother. The chromosomes carry genes, each being a piece of DNA, containing the code which (in part) determines physical characteristics.

However, egg and sperm cells are different, as they carry one chromosome out of each pair, i.e. 23 single chromosomes, half as many as regular cells. During fertilization, an egg and sperm cell fuse to make a cell with 46 chromosomes in 23 pairs; one chromosome of each pair comes from the father and the other one comes from the mother.

Only one pair out of these 23 pairs of chromosomes in the fertilized egg determines the gender of the fetus. In the human male this pair contains an X chromosome and a Y chromosome, so that a sperm cell, containing only one half of this pair, contains one of these two: an X or a Y chromosome. The corresponding chromosome in the human female contains two X chromosomes, so each egg cell has an X. Depending on the specific sperm cell merging with the egg cell, the joined egg and sperm cell may contain X-X or X-Y. In the case of the X-X chromosome, the fertilized egg will develop into a female; the X-Y chromosome will result in a male.

During development into adulthood sperm cells will develop in the body of the male and egg cells develop in the body of the female. These cells are very different. The egg cell is one of the largest cells in the human body; fully matured, it has a diameter of about 0,1 mm. By contrast, the sperm cell is one of the smallest cells in the human body; the head, containing the chromosomes, has a diameter of only about 0,005 mm. Thus the ratio of their volumes, if calculated for spherical forms, is 1: 10<sup>-6</sup>.

The egg cell is immobile; by contrast, the sperm cell can move about freely, which gives it the ability to move through the female reproductive tract. We distinguish two types of sperm motility,

referring to the way the individual cells move. Progressive motility refers to sperm cells moving in a more or less straight line or in large circles. Non-progressive motility refers to sperm cells that move in very tight circles.

Clearly the egg and the sperm cell form a complementary system, according to the definition of Jammer, as (1) they are distinct in size and motility, (2) both are necessary for reproduction, (3) they exclude each other as only a woman can produce an egg and only a man can produce a germ, and (4) each separately cannot generate new life.

The contrast between the relative large spatial expanse of the egg cell and the very much smaller one of the sperm cell has a resemblance with the basic mathematical item in twin physics, called the Heisenberg-unit. This is supplied with four mathematical attributes of space, two of them being spherical spaces called the major and the minor space (the two others are not relevant in this comparison). Applied to real physics, the minor space may describe a proton and the major space a relatively large magnetic cell around the proton. They have roughly a similar ratio as the egg and the sperm cell.

There is a second similarity: the three-fold motility of sperm cells - in a straight line, large circles or small circles, can also be found in twin physics. We have deduced four types of electrons [5], where electrons of type 2 and 3 move in small circles and the electron of type 4 moves in large circles or straight lines. These two similarities encourage us to apply the twin model to gender.

The different contributions to reproduction by men and women have consequences for the structure of the body. The organs that can provide space for the fetus mean that the woman menstruates and that the organization of drainage is less convenient than in men. Furthermore, hormones ensure that the female body is suitable to bear children and the male body to provide more muscle power in order to provide physical protection against outside threats.

In developed countries most women are no longer mainly engaged in childbearing and nurturing. If women are given the opportunity to study and work in appropriate occupations, it is readily apparent that they can do so. Similar, most men are no longer focused on defending against external foes by using their

muscle power. When men take on tasks that were previously left to women, it is becoming increasingly apparent that they can do so.

Therefore, the role of gender in the present modern life may be overestimated. We will take a closer look at this in the sequel.

### Human biological and psychological processes in general

We suppose that all biological functions in human life, except the reproductive ones, are subject to complementarity in each individual. The most straight-forward example is breathing. This activity consists of two distinct phases (breathing in and out) of one organ (the lungs), both refer to the process of supplying the body cells with oxygen, they exclude each other, and breathing is impossible by carrying out only one of them. So breathing is a complementary activity. Moreover, to stay alive it is necessary that these two phases alternate in time.

Similar examples can be found in the beating of the heart, the digestion of food and so on.

Apparently, to describe complementarity in human beings, we have to add the fact that the two sides of any complementarity alternate in time, so they go through two stages repeatedly. So, each function has to switch between one side and the complementary side of the system in consideration, which is called the switch rule. In breathing, each phase lasts a few seconds, at most a few minutes; in digestion, the phases of absorbing food and excreting waste products take hours, at most a few days. Each specific bodily function switches at a specific frequency, ranging from mere seconds to days or even years. All together they form a spectrum, similar to the light spectrum of light.

The frequency of biological functions may intentionally be brought forward or postponed by changing the diet, lengthening or shortening the time for sleeping, join a fitness club and so on. If this is carried out too flexible or too strict, health problems will arise in the long run.

We cannot always carry out each switch at natural moments or otherwise in the most optimal way. In practice, within certain limits an optimal frequency may be arrived at without causing problems. A slowed down function may be compensated by activating or intensifying other functions for some time; the same applies if an activity is brought forward. For instance, if you had a bad night, you

may stay fit during the day by drinking coffee; however, after three bad nights it doesn't work anymore.

We suppose that not only biological but also psychological processes are subject to complementarity in a similar way. Probably the frequency to alternate between complementary phases may be lower. We will consider these processes with special attention for gender, to find out to what extent there is a connection between behavior and gender. In a previous publication [8] we showed how the switching human functions can be divided in functions of body, mind and spirit; in this paper we will not consider this subdivision.

To be able to speak about switching functions without using formulas we will formulate two complementary characters in the context of human life by calling them the straight image and the magical image [8]. Functional phases requiring a concentrated use of energy belong to the straight image, those requiring a divergent use of energy belong to the magical image. These definitions correspond with the mathematical definitions in twin physics for application in regular physics [5].

We will give two examples from everyday life to get some idea of what is meant by these two expressions and to show that there remains a trace of the other phase. Example 1: if you read the newspaper, your energy is used in a concentrated way, as you focus upon the text, but still some attention remains for the surrounding, for instance to hear the doorbell ringing. When after some time you start to get distracted, you need a switch by drinking coffee, taking a walk or having a chat with someone. Then you spread your attention, which is a divergent use of energy, but still you can be aware of a later appointment. Example 2: if you have to look after five small children playing in a park, you have to use your attention in a divergent way, but still you may keep an eye on your watch, to bring them back home in time. When in the long run you feel tired, you need to switch to a concentrated activity, like reading a newspaper, but still you will notice that your partner is coming home.

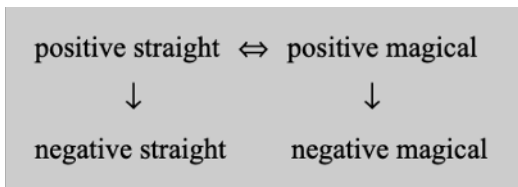
The trace of one character during manifesting mainly the other one is the reflection of the Heisenberg principle, extended to both sides of a complementary system [9]. The importance of this feature during the switching processes is that you won't lose touch with the rest of your life.

In summary, the twin model, derived from twin physics and expanded with the switch rule, can be expressed as:

- At each level the psychological functioning switches between two phases. These phases are complementary with each other, so they are distinct, they refer to the same function, exclude each other and cannot perform the complete function on their own.
- At each level a switch occurs in a specific optimal frequency, within a certain range.
- When one character appears, a trace of the other remains.
- All phases together form two basic characters, called the straight and the magical image.

**Word quartets**

We will express both characters in common terms. By arranging them in diagrams, called word quartets, you will recognize the contrast between straight and magical behavior. Below you see the most general word quartet. The first line on the left contains an expression belonging to the straight image, referring to a positive behavior or activity. “Positive” means that it is considered to be healthy and useful by yourself or your social surrounding, depending on what you want to investigate. On the right, a similar expression belonging to the magical image is given. The double arrow in between indicates that the two have to switch back and forth.



We suppose that, if within a critical time period no switch occurs, then the behavior or activity will turn into a negative appearance, which is indicated by the single down arrows. There you see a word with a negative meaning.

If one side of the diagram is degenerated, in principle the other side may continue to manifest itself in a positive way, as soon as it

is time to switch. But if its complement is degenerated, it cannot have an exchange with the complementary negative behavior and so results of the previous phase in the complementary new phase cannot be processed. Because of that, it is not certain that the (previously positive) complementary behavior will still be appreciated by the person concerned or by his or her environment.

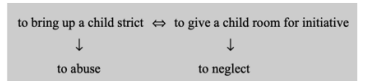
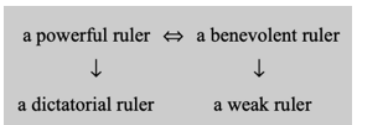
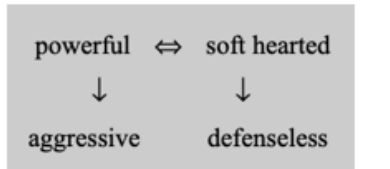
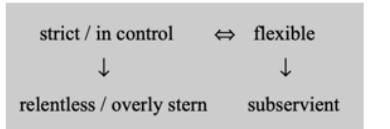
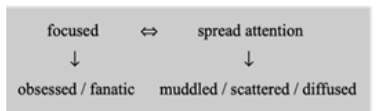
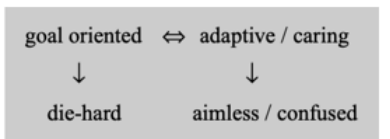
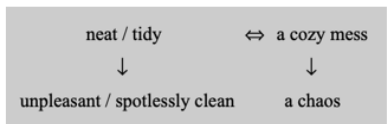
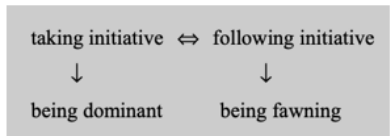
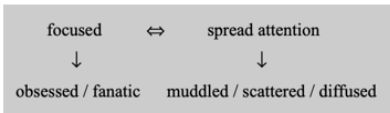
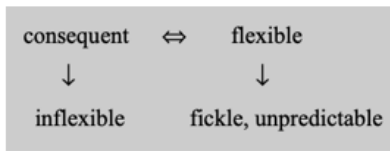
The labels “positive” and “negative” introduce an appreciation or a disapproval, which may differ for each person and by circumstance. This makes it possible to deal with personal experiences, by yourself or a mental health care provider, to find out in which image something is wrong and what should be changed to restore the subject’s well-being.

The lack of an appropriate switch may be caused by many reasons. It may be a lack of practical possibilities or the conviction that it is decent to brake a switch or a religious decision, and many more examples can be thought of. Also, an impaired development of the magical or of the straight image could be at play.

For example, if somebody drinks increasing amounts of alcohol, then in the course of time this could be considered as a negative expression of the magical image, as alcohol gives relaxation. The solution can be found by searching for more healthy activities belonging to the magical image, which also requires a divergent use of energy. Depending on the preferences of this person, this can involve activities like taking care of plants or animals, singing in a choir, learning to cook and so on. If this necessity is not recognized, this need for longer or more intense magical phases will disturb the regular switch process. At some point, the influence of alcohol will be followed by a straight phase, appearing as well in a negative form, such as aggression. The obvious advice to exercise more self-control and drink less alcohol would stimulate the straight image and so increase the need of developing the magical image, so this advice would increase the necessity to drink.

It is very practical to have a system for estimating on which side an unhealthy process began: on the straight or on the magical side. Word quartets are very useful for this purpose, especially if you construct word quartets matching your own experience. Below we give some general examples.





### Human behavior and gender

Taking together all positive straight expressions from the word quartets of the previous section, we get the series: consequent, focused, to act, neat/tidy, goal oriented, focused on essentials, strict/in control, powerful, a powerful ruler, to bring up a child strict. If we would ask people which person could be described with these words, a vast majority would think of a man. Only 'neat/tidy' and 'to bring up a child strict' would remind one of a woman, because cleaning the house and bringing up children are traditionally considered as female tasks.

Taking all positive magical expressions from the word quartets, we get the series: flexible, spread attention, to wait, a cozy mess, adaptive/caring, attention for details, flexible, soft hearted, a benevolent ruler, to give a child room for initiative. If we again asked people which person would best fit the description, a vast majority would think of a woman.

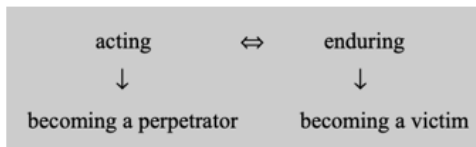
It is useful to correct very young children in their behavior as soon as this starts having a negative impact on their social environment. Also it is useful to correct adolescents if they don't do their homework, if they are impudent or have wrong friends, as this would hamper their future possibilities. In this way children learn to control themselves and to adapt to what is expected of them, in order to become a valuable and happy member of society.

A problem arises when the development of the straight image in itself is considered negative for girls, and the development of the magical image is considered negative for boys. Then the well-intentioned upbringing turns into the teaching of unbalanced behavior. Girls will adapt to positive magical features, and the straight image will lag behind in the development. Boys will adapt to positive straight features, and the magical image will lag behind. In the long run, boys as well as girls will feel the necessity to switch in all functions, depending on their specific talents and wishes. But they did not learn how to develop their undesirable side in an appropriate way and they did learn how to postpone this natural need.

It's no surprise that at some point grown up girls will develop negative straight behavior, such as focusing on being the best dressed and most attractive woman, and that grown up boys will develop negative magical behavior, like making a terrible mess of

their room. Later in life, a failed marriage may end in relentless aggression of the woman towards the man, and the man may plunge into adventurous trips of whatever type. Both ex-spouses have then ended up in a huge catch-up of the unwanted complementary character. These are just a few examples to give you some idea of the dangers of a one-sided upbringing.

The history of the #MeToo Movement is interesting to place into a word quartet. Tarana Burke, an advocate for women in New York, coined the #MeToo phrase in 2006 to empower women who had endured sexual violence. No one could have imagined that this movement would create such a stir; apparently for many women the time was right to shake off the traditional pattern of relationships. It is striking how often in the cases that came to light the woman had allowed herself to be silenced for years, enduring what was done to her. Also it is striking how surprised many men were that they were charged. A relational development like this may be represented in a word quartet as follows:



The occurrence of this situation is not related to the human reproduction process, but to misguided notions of gender. If a woman by circumstance developed a strong straight image but a weak magical image, then she might in similar way misbehave towards a man who by circumstance developed a strong magical image but a weak straight image.

Another subject about which there is much confusion related to gender, is identity. A passport, being proof of one’s identity, states the bearer’s nationality, full name, date of birth, place of birth, gender and length. Only two of these six facts, nationality and gender, could be changed in principle, but only with a lot of effort. We consider a passport as the straight image of the concept identity. The magical image of this concept consists of a manifold of characteristics belonging to this person. When you meet someone, you know their identity without needing any proof, because of the appearance, the glance, the voice, the smell, the way of moving and so on. This aspect of identity is individual and unique, as it depends both on the person referred to and on the one who meets her or

him. We consider the personal appearance as the magical image of the concept identity.

Each person also has their own conception of identity, regardless of what others think about it. This may differ considerably from the public opinion, especially during puberty. As a result of a strongly gendered upbringing, many people consider their gender as the most determinant of their identity, which becomes apparent when you ask someone to describe who you are in one word. This view might be a major obstacle to developing their talents freely.

Sometimes someone would even rather be of the opposite sex, which nowadays is possible through an operation and hormone treatments. This happens relatively often in young people before they reach adulthood. This is the period to discover step by step your identity in all its aspects and at best the process is not disturbed by too much attention for sexuality, let alone pregnancy. It is not unconceivable that young people want to change their sex out of dissatisfaction with the social position that is linked to gender. Therefore it is important that they can be guided by someone who understands the tension between identity and gender.

**Conclusion**

Only one of the 46 chromosomes is not shared by both males and females. That relatively small difference is vital when it comes to reproduction but is overestimated when it comes to the social position in countries where reproduction is no longer all-determining. That which is considered specifically feminine or masculine is highly dependent on the country, the historical period considered and personal views.

To bring some order to this chaos of views on gender, a physical theory called ‘twin physics’ is applied to gender. This theory describes an intermingled occurrence of certainty and uncertainty in physical phenomena, based upon a mathematical definition of complementarity. Twin physics is transformed into a simple version, called the twin model, by adapting this definition to biological functions in general and adding the rule that they are subject to the so-called switch rule. This rule requires that in each function a steady, continuous switching between two complementary phases in each function has to take place; at each level this switch occurs at a specific frequency.

Next we supposed that not only biological but psychological processes too are subject to complementarity in a similar way. We formulated two complementary character-profiles in the context of human life and called them straight image and magical image. Functional phases requiring a concentrated use of energy belong to the straight image, those requiring a divergent use of energy belong to the magical image. Both characters are expressed in common terms and organized in diagrams called word quartets.

The word quartets explain the difference between straight and magical behavior, as well as a change from 'positive' to 'negative', occurring when within a critical time period no switch occurs. These indications introduce an appreciation or a disapproval, which may differ for each person and situation. This makes it possible to deal with unique personal experiences, to find out in which image something is wrong and what should be done and how in order to restore the well-being.

According to the twin model there is only one relevant difference between men and women, being the difference in genital build and the resulting share of reproduction. The physical consequences of the female part are considerably greater than those of the male part; in this respect it is indeed necessary to make a gender difference between women and men. Therefore, a society that is really serious about equally sharing the burden of reproduction should support women properly during monthly menstruation, as well as during pregnancy and breastfeeding.

The naturally split contributions to reproduction do not mean that unrelated activities are also naturally split according to gender. Nevertheless, gender generally receives a lot of attention in upbringing because parents consider it decisive; traditional examples in the environment are easily adopted or religious consequences are attached to it. The assumption that gender difference pervades almost all facets of daily life upsets the balance between both character profiles and undermines a healthy development of identity. Excessive attention to gender leads to wasted talent, mental and psychological problems, unnecessary and unhealthy tension in the workplace and a general decrease in well-being.

The twin model is a simple method to get a better grip on developing insights about how to pay less attention to gender during upbringing and education. It may be a tool for doctors and

therapists to detect which side of the character is distorted or neglected and to find a way to restore this. Young people could be given better guidance in exploring their identity if people around them had a better understanding of the tension between identity and gender.

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The author declares no conflict of interest.

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