

# Sense-Oriented Reasoning at Three Progressive Levels in Tribal and Modern Societies

Franz Klaus Jansen

Sense-oriented reasoning (SOR) was analyzed by comparing the reasoning of tribal and modern societies on a specific subject, the conception and birth of a child. Tribal societies have beliefs, which are difficult to understand by modern societies. Their reasoning becomes understandable only when considering that their observations are limited to the macrocosm. Modern societies have access to the microcosm with a microscope, where different biological mechanisms for the conception of a child were discovered. Since the tribes' macroscopical observations were different, their conclusions became necessarily different. The inheritance problem can only be solved by genes at the microscopic level, to which tribal societies had no access. With observations limited to the macrocosm, tribes logically invoked invisible child-spirits of ancestors wanting to be reincarnated in children of the same tribe. Besides the different access to observation, the reasoning of both societies is similar and built around the investigation of a final sense. Reasoning progresses after a phase without any quest for sense through three progressive levels: (1) primary sense, (2) corrected sense, and (3) verified sense. In tribal societies, reasoning is interrupted at the primary sense level when it seems consistent with their general beliefs and traditions. This resembles coherentist theories of epistemic justification, in which justification is only a function of coherence between beliefs. Tribal societies realize the input problem of these theories, since they have no access to the microcosm and also illustrate the Gettier problem. Modern societies progress to the higher levels of corrected and verified sense reasoning, even if inconsistent with their prior beliefs. They initially imagined genes as a hypothetic missing link for inheritance, which relies on a start observation concerning the character of ancestors to the target observation, the similarity with the character of children. If the missing link is definitely verified, it shows a chain of justified beliefs between both observations, allowing the initially hypothetic missing link to be retrospectively considered as the real cause. The SOR of modern societies resembles the externalist version of foundationalism of epistemic justification, in which the necessary non-inferential justification is represented by the target observation.

*Keywords:* tribes, modern societies, child conception, child birth, reasoning, Gettier problem, coherentism, foundationalism

## 1. Introduction

The world view of modern societies of the 21st century is completely different from that of tribal societies, as long as they had no contact with modern societies. Scientifically well-established phenomena in modern societies, such as their knowledge on the conception and birth of a child, were considered by tribal societies in a manner completely incomprehensible to modern societies. Bronislaw Malinowski (1927; 1929) reported that

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in a society of the Trobriand Islands in New Guinea, it was believed that “the sperm does not contribute to the development of a child.” Maurice Godelier (2007) showed that the reasoning of tribal societies is very different from that of modern societies. Since both kinds of societies are of the species “*homo sapiens*,” their reasoning should be similar. Although our societies are able to understand highly complex phenomena like quantum physics (Jansen 2008), the reasoning of tribal societies remains incomprehensible. Is it due to a difference in reasoning or to the limitation on macroscopic observations?

Knowledge of tribal societies is strictly limited to macroscopic observations of nature, which is completely insufficient to explain biological functions at the microscopic level, essential to the understanding of biological mechanisms. In order to understand the reasoning of tribal societies, we have also to limit our observations to the macrocosm and then try to follow the tribal interpretations. At the macroscopic level, the sperm is a viscous, white liquid, which does not seem to differ from one individual to another and should be unable to transfer varying heritable traits. Thus other explanations had to be found. Only the microscope, which tribal societies could not imagine, showed that semen contains millions of sperm cells carrying different genes responsible for heredity. Since the macroscopic observation of nature is identical for tribal and modern societies, one should be able to understand their reasoning. Putting aside any moral interpretation and considering only beliefs on the conception and birth of a child, some reports from tribal societies were compared with the knowledge of modern societies (Godelier 2007).

The great differences in knowledge allowed analyzing the general way of reasoning in tribal versus modern societies. Tribal societies deprived of access to the microcosm of biology, nevertheless tried to give a sense to their observations of the conception and birth of a child, which corresponds to a sense-oriented reasoning (SOR). With respect to the knowledge of modern societies, their explanations remained only on a primary sense level. Modern societies also starting with primary sense level of knowledge went further in their scientific progression through two higher levels of reasoning. When questioning the primary sense level, it has often to be corrected. Nevertheless, a corrected sense level could still be false and therefore needs verification if it really corresponds to the proposed sense. Therefore, there are, in all scientific evaluations, three levels for the progression of reasoning from primary sense to corrected sense and finally to verified sense. Nevertheless, in normal life the verified level is often not reached and many personal judgments remain on a level of primary sense reasoning, similar to tribal societies.

The three levels of SOR should correspond to theories of epistemic justification. Thus the primary sense level is embarrassed with the Gettier problem and corresponds to coherentist theories of epistemic justification, whereas the highest level of verified sense reasoning reached by modern societies corresponds better to foundationalist theories of epistemic justification. Both theories are consistent with the lowest and highest levels of SOR.

## **2. Quest for a Sense of Reasoning in Tribal and Modern Societies**

The anthropologist Maurice Godelier (2007) described his own research on the Baruya society in New Guinea and also summarized some important points of other studies such as Malinowski (1927; 1929) on a society of the Trobriand Islands of New Guinea. There are some very surprising findings appearing incomprehensible to us today. The Trobriand society believes that “the sperm does not contribute to the conception of a child” (Godelier 2007, 124) and that there is a child-spirit conceiving the child with the help of menstrual blood of women. “Child-spirits are spirits of ancestors, who wish to be reborn in the body of one of

their descendants.... It mingles with menstrual blood and evolves in a foetus, a liquid mass, which is not yet a child. The blood of the woman will then produce flesh, bones and the skin of the foetus.” Repeated sexual intercourse “will produce three effects, create a plug of sperm, prevent the woman’s blood to flow out and print at the shapeless mass of clotted blood a form that will look like the father. Periodic contributions of sperm feed the foetus during pregnancy. Thus, man pierces and blocks the women, he models and nourishes the foetus” (2007, 125).

How can there be so different interpretations of the conception of a child in tribal and modern societies? In both societies, reasoning is based on the belief that the observed events are not due to chance only, but should take part in a cause-and-effect network. It should then be possible to find out the right sense of events in this network, which would allow to predict future events. This is meant by SOR. Only based on their observations in the macrocosm tribal societies attempted a first explanation by linking newly observed events to already known similar events. They cannot go further to verify their first explanation, and if it is in agreement with other previous knowledge or was already transmitted by their ancestors, then they will firmly believe in it. These interpretations are so different from modern societies, because tribal societies were unaware of the microcosm, which is only accessible with the help of a microscope. Nevertheless, they had to ask the same questions on biological problems during the process of the conception of a child, such as how is the transmission of heredity from the parents to the child possible. Since their observations were limited to the macrocosm, they necessarily came to different interpretations with respect to modern societies whose knowledge extends from the macrocosm to the microcosm.

### **3. Tribal Reasoning on the Conception of a Child Limited to Macrocosmic Observations**

Modern societies have an almost complete knowledge on the conception and birth of a child, showing a great difference to the interpretations of tribal societies. If modern societies also limit their knowledge only to macroscopic observations, which are the same for both societies, one should be able to understand the reasoning of tribal societies when they try to explain the same biological problems.

The discussion will be limited to several examples of the belief of tribal societies, which can be directly compared with the scientific understanding of modern societies on biological evolution and pathology during child conception and birth.

#### *3.1. Uncertainty of the Conception of a Child*

Belief of Trobrianders (New Guinea):

“Sperm does not contribute to the conception of a child” (Godelier 2007, 124).

Belief of Nas (China):

identical to the belief of the Trobrianders (Godelier 2007, 126).

Macrocosmic observations:

Observations in the macrocosm reveal that the sexual intercourse is far more frequent than pregnancy. Thus there is no apparent correlation suggesting that a deposit of sperm will not automatically lead to pregnancy. The disproportion between the frequency of sexual intercourse and pregnancy may have led tribal societies not to assign a causal link between the deposit of sperm and pregnancy. Therefore, there must be another cause.

Modern societies found indeed the reason, which lies in the microcosm. Fertility of an egg in the mother’s ovaries lasts only a few hours in every month and the viability of sperm is limited to a few days. Thus some

chance is needed to bring together a viable spermatozoid to a fertile egg. Since the Trobriand Islanders and the Na (Yunnan province, China) did not have this knowledge and these reasons for pregnancy remain invisible, they were forced to evoke an invisible spirit, in which they believed already since their ancestors. With the access to the microcosm of modern societies, the causes for the uncertainty of pregnancy became visible and no longer required the intervention of an invisible spirit.

### 3.2. *Inheritance of Traits of Characters*

Belief of Inuits:

“In the belly of the female the foetus takes shape and this shape will resemble its father or mother according to the power of the vital energy of both” (Godelier 2007, 119).

Belief of Trobrianders:

“Children-spirits are spirits of an ancestor who wishes to be reborn in the body of one of their descendants.... All children are thus reincarnated ancestors through the spirits who bring in his body the spirit of an ancestor of his clan” (Godelier 2007, 125).

Belief of Telefolmins:

“The foetus is not yet a child. It will become a child when a soul is added and develops in him, which takes a form that distinguishes it from others. This is the effect of SINIK, a force, a power, whose origin is not well known by the Telefolmins” (Godelier 2007, 131).

Macrocosmic observations:

The growing child acquires more and more striking similarities in its appearance and character with his parents or his ancestors. This cannot be explained at the macroscopic level by visible forces, but only by invisible ones. Inheritance is a fact remarkable by both societies. Nevertheless, the sperm is a viscous, white liquid and seems to be identical in all individuals. Therefore, it could not be considered at the macrocosm to transmit hereditary characters from ancestors to the child. If the cause is not the visible sperm, it should be an invisible cause, such as an invisible spirit for passing heritable traits to a child. Thus the Trobrianders thought that the ancestors should have a child-spirit with the desire to be reincarnated in a child of the same tribe.

In contrast, for modern societies, the cause of heredity became directly visible, but only under the microscope, since the genes in the spermatozoid filled the same role as the child-spirit. They are sufficiently variable to transmit all hereditary traits of characters. The macroscopic observation that there must be a cause for inheritance of characters is shared by both societies, although it was invisible in the macrocosm for tribal societies, it became visible under the microcosm for modern societies.

### 3.3. *Inhibition of Menstruation before Pregnancy*

Believe of Trobrianders:

Sexual intercourses “will create a plug of sperm that stops the menstrual blood to flow out” (Godelier 2007, 125).

Belief of the Tonga Islanders (Polynesia):

“The sperm of man plays only one role: it blocks menstrual blood in the uterus. It forms a clot that develops into an embryo” (Godelier 2007, 134).

Macrocosmic observations:

Menstrual blood of women disappears in early pregnancy suggesting a connection with the conception of a

child. On the other hand, sperm is a viscous liquid, able to form a kind of dry skin and could clog up the exit of the uterus. The observation of the disappearance of the menstrual blood suggested to tribal societies that it is passively retained by sperm in the uterus, since as it dries it forms a skin and then blocks the outflow of blood.

Modern societies consider the menstrual blood loss as an active process, which retains the lining of the uterus necessary for receiving the fertilized egg. Cessation of menstruation then indicates that the sperm fertilized an egg, which secretes hormones to retain its lining. At the macroscopic level the inhibition of the menstrual blood flow could indeed be explained as a passive process, only the existence of hormones in the microcosm allowed modern societies to detect a very complex active process.

### 3.4. Miscarriages

Belief of Trobrianders:

“It [the child-spirit] is mixed with menstrual blood and becomes a foetus, an inform mass, which is not yet a child. The blood of the women will then produce the flesh, bones and the skin of the foetus” (Godelier 2007, 125).

Macrocosmic observations:

An embryo can be observed at the event of miscarriage during the first two months of pregnancy. It consists of a shapeless liquid mass, mixed up with blood and does not yet show any bones or skin, while the miscarriage of the foetus in the later months of pregnancy shows small children already formed with their head, legs, arms, bones, and skin. Therefore, the child-spirit of tribal societies could first form a shapeless liquid mass, which only later during the process of pregnancy acquires flesh, bones, and skin.

### 3.5. Sexual Activity during Pregnancy

Belief of the Baruyas:

“As soon as a woman is pregnant, the couple increases sex, because the sperm of man is supposed to nourish the foetus” (Godelier 2007, 121).

Belief of the Trobrianders:

“The contributions of semen will nourish the foetus during pregnancy. Thereby the man pierces and blocks the women, he models and nourishes the foetus” (Godelier 2007, 126)

Belief of the Nas (China):

“The sperm does not produce the foetus, but helps to make it grow” (Godelier 2007, 127).

Macrocosmic observations:

Tribal societies interpret increased sexual activity as a necessity to feed the child in the womb. The knowledge of modern societies indicates that sperm does not add anything to feed the child, but increased sexual activity may be caused by the hormonal changes in the women, which tribal societies could not know.

### 3.6. The First Cry of a Child at Birth

Belief of Inuits:

“The master of the universe introduces into his body an air bubble, which will become his breath” (Godelier 2007, 119).

Belief of Baruyas:

“It’s the sun, the father of the Baruyas, which complements the body of the foetus in the womb and provides him the breath” (Godelier 2007, 122).

Macroscopic observations:

The first cry of the child at birth is important for the change from the womb filled with liquids to the air. Sometimes the cry can delay and greatly worry the parents. In the macrocosm it cannot be seen if the inspiration needed for the first cry is due to insufflation from the outside or inspiration from the inside. Thus it can be interpreted by tribal societies as an insufflation by an invisible spirit from the outside or by modern societies as an active inspiration from the inside. If the first cry is delayed, tribal societies may believe that a spirit does not accept the baby. Modern societies know that the first cry follows an active inspiration, due to the lack of oxygen in the blood of the child, which is caused by the cessation of the function of the umbilical cord.

### 3.7. *Birth Defects*

Belief of Baruyas:

“The sperm of man is not enough ... to make a child for the Baruyas. It makes the bones and flesh of the foetus, but not the nose, the eyes, the mouth, the hands or the fingers of the hands and feet. Only the sun completes the human embryos in the bellies of women” (Godelier 2007, 155).

Macroscopic observations:

The Baruyas have certainly been aware of deformed children with cleft lip or malformations of the hands and feet. Since these anomalies appear only at the birth of a child, they could depend on an invisible factor acting in the womb. Such cases showed the tribal societies that sperm and menstrual blood are insufficient for the birth of a normal child. Therefore, an invisible factor must be responsible for the final maturation of the foetus. Although semen and menstrual blood are capable of inducing bone and flesh as seen on embryos of miscarriages, they are insufficient for finishing the nose, mouth, and hands. Thus the invisible cause for completing the foetus in the womb could only be the spirit of the sun, considered as the father of the Baruyas. Modern societies know that the invisible factors are genetic mutations inducing birth defects.

### 3.8. *The Rapid Rise of Maternal Milk*

Belief of Baruyas:

“... married men give their sperm to swallow their young wife with the idea that this substance will turn into milk, the milk which fills the breasts of women when they feed their children” (Godelier 2007, 123).

Macroscopic observation:

During pregnancy and especially after birth women’s breasts grow and give milk, a whitish fluid with resemblance to sperm. There are no visible signs that might explain the sudden increase of milk after birth. Thus the Baruyas have to find a reason and imagine, in part due to the similarity of color between semen and milk, that their increased supply of semen during pregnancy should be the source of the milk of women. Modern societies know that the invisible factor is a secretion of hormones, which induces the production of milk.

## 4. **Modern Societies with Three Different Levels of SOR**

By limiting our observation to the macrocosm we can imitate the approach of tribal societies for a better understanding of their interpretations. However, their reasoning is unable to go far enough for the verification of their interpretations. This allows comparing the ways of thinking in tribal and modern societies and analyzing human thinking in general. Reasoning tends to find a sense for observations (SOR) and can thereby progress after a pre-sense phase without any interpretation through three successive levels (primary sense; corrected sense; verified sense):

Nevertheless, reasoning can also stop at each level without progressing to the superior level. Consequently,

knowledge at the level of primary sense can sometimes be very far from reality.

Pre-sense level of reasoning:

In normal life there are often amazing events, which do not seem to correspond to anterior knowledge. If there is great regularity, one will expect a yet unknown cause. Nevertheless, one is not always inclined to push reasoning further ahead and then stops at this pre-sense level by disinterestedness. It is very common to stop reasoning at this level in tribal as well as in modern societies, since one cannot explain everything and there is not always sufficient interest and necessary time.

Primary sense level of reasoning:

At the first level of reasoning, one starts looking for a cause that could explain the amazing repetitive event. This leads to a first idea, which comes in mind and may be a plausible first explanation. In general, one proceeds by looking for analogies, which are limited to already acquired or generally believed knowledge in the culture of a society. The analogue becomes the first interpretation of a cause, which can be called with respect to its uncertainty a primary sense. Reasoning in tribal societies is often interrupted after the primary level of reasoning, when it seems sufficiently logic and plausible. Nevertheless, even in modern societies reasoning can stop at this level, when a hasty interpretation is already taken for the truth without any verification.

Corrected sense level of reasoning:

When some doubts remain on the validity of the primary sense, there will be a certain distrust on its interpretation corresponding to the second reasoning level of corrected sense. Other interpretations have to be advanced for the same event. As long as no interpretation is convincing, they remain uncertain and require further exploration.

Verified sense of reasoning:

The third reasoning level is obligatory for every scientific research, which has to prove that one of the possible interpretations indeed corresponds to the reality. Since different hypotheses that were raised could explain the same phenomena, they have to be put to test. A first requirement of a new assumption is its internal logic, the second the possibility to explain the phenomena convincingly. After comparing all hypotheses, only the best adapted to the circumstances will become the verified interpretation.

## **5. Tribal Societies Limited to the Pre-sense and Primary Sense Levels of Reasoning**

In tribal societies reasoning could be interrupted at the pre-sense level by disinterestedness because there was no sufficient need to find an explanation. Therefore, certain societies like the Baruyas have not bothered with the problem of heredity. The Tonga societies did not see the problem of heredity either, since the same spirit "Tu'i Tonga ... was presented as the fertiliser of all women" (Godelier 2007, 135).

However, much reasoning reported in the literature reached the level of primary sense, where it was in general stopped before reaching the corrected and verified levels. Thus the reasoning of tribal societies is so astonishing because it could not verify its interpretations at the level of the microcosm.

Nevertheless, tribal societies had to find their primary sense sufficiently plausible to believe in it. If they interpreted the absence of menstruation in early pregnancy by blockage of the entry of the womb with sperm, the blood retained in the womb could create a child. There are plausible analogies in everyday life such as fermentation that could have induce this kind of reasoning. Non-sterile biological products in a container, such as milk or blood, produce with the help of bacteria organic life. In a similar way they could have imagined to trigger the development of a child by retaining the menstrual blood in the womb. There is no denying a certain

internal logic that could have made sense for a tribal society and the internal logic could have satisfied the astonishment induced at the pre-level of reasoning. However, internal logic alone is insufficient to reflect reality and has finally to be verified at the verified level. Nevertheless, as long as there were no contradictions, the primary sense was satisfactory for tribal societies, whereas modern societies are very aware that a first assumption is often wrong and are wary of believing it before verification. In any case, tribal societies were limited to the verification of their primary sense interpretations, since they had no access to the microcosm and were forced to accept it.

## 6. Credibility of Primary Sense Reasoning in Tribes

Often the primary sense does not reflect reality, until it is verified at the third level. Nevertheless, it can acquire a great credibility in tribal as in modern societies for at least five reasons.

(1) As long as the belief of a primary sense has no serious negative consequences in the life of an individual or the whole society, it remains credible. Thus the primary sense imagined for fertilization of the egg does not interfere in the process of procreation and then does not provide compelling reasons to change the conviction of a tribal society. Lacking conflicts in the context of normal life is the first reason for credibility.

(2) The internal logic of a primary sense interpretation also augments its credibility. For example, when imagining a fermentation process, it may seem logical that the channel of the womb should be blocked to prevent a blood outflow. Thereby common sense could reinforce the credibility.

(3) An important factor is in compliance with pre-existing beliefs of a society, since any explanation against the general belief of a society would be immediately rejected. The Baruyas are a patriarchal society, convinced of the dominance of men over women. Man is the true source of strength and life (Godelier 2007). The male dominance is regularly found in primary sense interpretations of the Baruyas, for example, when they think that semen nourishes the foetus.

(4) If in addition a primary sense interpretation becomes a real support for anterior beliefs of a society, it increases its credibility even more. Thus the inclusion of male dominance in primary sense explanations brings further evidence for a pre-existing belief in this tribal society, for which sperm blocks the menstruation blood, nourishes the foetus, and is transformed into milk for the baby. The confirmation of men's superiority at the primary sense level gives it a better chance to be accepted.

(5) Finally, the transmission of a primary sense conviction from one generation to another is one of the strongest arguments for its credibility. With these five reasons a non-verified primary sense interpretation can become almost certain without ever being verified, in tribal as well as in modern societies.

## 7. Primary Sense Level in SOR of Modern Societies

Modern societies had also experienced primary sense reasoning and accepted primary sense interpretations for centuries. Ancient Egyptians believed that the earth was flat (Wikipedia 2011) and up to the 16th century it was believed that the sun revolves around the earth, called geocentrism, until Copernicus, Kepler, and Galilei proved the contrary. Since the idea of geocentrism proposed by Ptolemy in the second century after Christ was perfectly consistent with the *Bible* and a strong support of Christianity, this idea had not to be verified. The young Galileo (2008) still remained in strict obedience to the beliefs of the Roman church when he calculated the shape, location, and dimensions of Dante's hell and also measured the size of Lucifer in the year about 1587. Only in later years, when he was forced to question the primary sense interpretation of geocentrism, he became



opposed to the general Christian belief. After observations with a telescope, he saw four moons revolving around Jupiter, which was not in agreement with the official belief in geocentrism and therefore rejected by the Christian hierarchy. This shows how, also in modern societies, a primary sense reasoning could remain in force for centuries and resist to any verification, because it was an important support for the religious belief of a society.

Primary sense reasoning is also very widespread in normal modern life, since it is the first interpretation coming into mind. Although it needs verification, even if primary sense is in agreement with common sense, further verification is often inhibited. If due to the circumstances somebody could reasonably be a murderer, common sense reflection does not always continue to the necessary verification. Thus innocent people have been held for responsible for unsolved crimes.

### **8. Three Levels of SOR in Modern Societies**

In modern societies all levels of reasoning can be found. The pre-sense level is often found in everyday life, since there is not always the time or the possibility to search a new sense for explaining an amazing repetitive event. Then there is no explanation at all due to disinterestedness.

The primary sense level is reached if one accepts the effort to find a meaning, but there is a temptation to accept the primary meaning too easily. For instance, if somebody is suspected for a murder or other crimes, a primary sense opinion is very easily accepted, simply because it seems plausible. Fortunately, advanced societies are protected by justice institutions that require verification up to the third verification sense level, in order to find the truth and not to accuse an innocent person. On the other hand, all scientific research is very aware of possible misinterpretations of a primary sense hypothesis and requires verification of all primary sense interpretations at the verification level. Thus all scientific proceedings go through all levels of reasoning before fixing a reliable explanation.

Although the explanation of fertilization by the Trobrianders was still very simple, the explanation of advanced societies became very complex. The modern scientific community reached a highly reliable knowledge, but the path was very long and required the inventions of new instruments and methods. Research progressed in small steps and for long time periods, sometimes over centuries, in order to verify all possible alternatives. This was the only way to reach the conviction that scientific explanations have become highly reliable.

### **9. Correspondence of SOR Levels to Epistemic Justification Theories**

Tribal and modern societies are reasoning in similar ways, whereby reasoning is "... the process of thinking about something in a logical way in order to form a conclusion or judgment" (Merriam-Webster dictionary).

This kind of reasoning is a sort of inferential regress reasoning according to foundationalist theories of epistemic justification, in which the intermediate propositions are well known. An initial proposition  $P$  has to be inferred from a known first proposition  $E_1$ , which can explain with its activity  $F_1$  the initial proposition  $P$ . In a further step  $E_1$  has to be inferred from  $E_2$ , which also explains with its activity  $F_2$  the known intermediate  $E_1$  and so on down to a non-inferential proposition (Fumerton 2010).

If intermediate causes corresponding to the secondary propositions,  $E_1$ ,  $E_2$ , etc., are still unknown, inferential regress reasoning has to be replaced by SOR, which tries to give a sense to two related observations by linking them together in a logical way, but through a hypothetic missing link. This situation is generally encountered in science when unknown causes are to be explored, but it can also be found in uncertain situations of normal life, for instance, when a murder has to be identified. The missing link should establish a sense

between related observations, but as long as it remains hypothetical, it corresponds to a primary sense level, which has further to be corrected and finally confirmed by verification before it can be considered as reality. Only after final verification of the missing link, SOR can show the same inferential structure as foundationalist theories of epistemic justification. The missing link is an intermediate between the source and the target observation in SOR, which corresponds in foundationalism to the intermediate propositions  $E_1$  and  $E_2$  between the initial proposition  $P$  and the regression to non-inferential knowledge (see fig. 1).

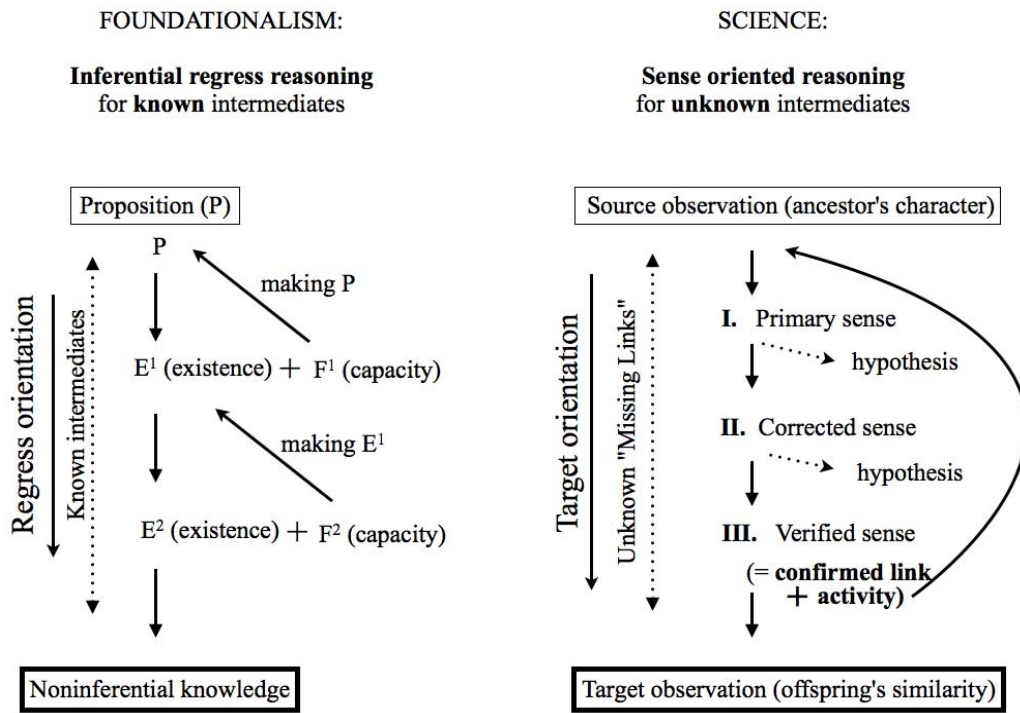


Fig. 1. Comparison of Foundationalist Theories and SOR.

SOR can be compared with modern theories of epistemic justification. It is based on the conviction that two related observations are linked together by a yet unknown missing link, which can for the first time only be imagined as a hypothesis. If verification of the hypothetic missing link between a source and a target observation allows the establishment of a chain of inferential justified beliefs, the initially hypothetic missing link can be retrospectively considered as verified reality. This is the normal process in natural science of modern societies.

Depending on which level the reflection was arrested, at the primary, the corrected, or the verified sense, SOR corresponds to different theories. At the primary sense level, SOR often progresses by analogy. John F. Sowa and Arun K. Majumdar indicated in *Analogical Reasoning* that “*analogy is a prerequisite for logical reasoning*” (2003, 20), thereby analogy leaves the way open for progression to the corrected and verified sense levels.

On the other hand, primary sense level resembles coherentist theories of epistemic justification. Tribal societies as well as modern societies made the same observation that some traits of the character of ancestors were also observed in their offspring, which suggested a link between ancestors and children, generally appointed as inheritance. The missing link was unknown and could only be imagined by hypotheses, which were differently interpreted by both societies. Since the missing link was unobservable in the macrocosm for

tribal societies, they tried to find analogies in their belief systems limited to the macrocosm to explain the link. They already believed in spirits and therefore imagined unobservable children-spirits wanting to be reincarnated. Another coherence with anterior beliefs was their conviction of the domination of men over women, common in patriarchal societies. Thus they held the role of sperm not only responsible for the conception of a child by blocking the menstrual blood in the womb, but also for the nutrition of the child during pregnancy and thereafter for the production of milk in the mother. The correspondence of their primary sense of reasoning with anterior beliefs resembles coherentist theories of epistemic justification but also shares the same problems with this theory (Kvanvig 2007). The first problem concerns the “input,” which is the main problem at the primary sense level of tribal societies as well as in coherence theories. “Coherence is purely a matter of the internal relations between the components of the belief system; it depends in no way on any sort of relation between the system of beliefs and anything external to that system.... Nothing about any requirement of coherence dictates that a coherent system of beliefs need receive any sort of input from the world or be in any way causally influenced by the world” (BonJour 1985, 108). A second problem of coherentism is its connection to the truth, which also remains a major problem for the primary sense level. “... coherence and likelihood of truth are so far apart that it is implausible to think that coherence should be conceived of as a guide to truth at all ...” (Kvanvig 2007, 14). The connection to truth would have needed full access to observations in the microcosm, which was impossible for the tribal societies. Thus even if the personal evidence for their beliefs was important, their beliefs were far away from the reality.

The false primary sense interpretations of tribal societies could be considered as an extension of the Gettier problem (1963) from individuals to whole societies and show how beliefs have to progress from unverified to verified level of knowledge. In modern epistemology the Gettier problem was a counter example to the definition of knowledge as true justified belief. Martin Cohen (2007) illustrated it with an example in everyday life. When a farmer wanted to be sure that his favorite cow was quietly eating in the field, he went to the gate and saw a cow behind a bush, which he recognized as his favorite. His dairyman also controlled the cow and found that it was indeed in the field, but in a hollow where the farmer could not see it, nevertheless, there were some black and white papers in the bush. The farmer, due to his sensual perception of the cow, had a true justified belief and therefore should have had the corresponding knowledge. Nevertheless, the farmer’s belief was based on an illusion and could not represent true knowledge, although he had the personal evidence to believe in it. In the same sense tribal societies strongly believed in their primary sense interpretation on the conception of a child, since their reasoning was in agreement with their general beliefs. However, due to lacking access to the microcosm, their premise was false and led to false conclusions, resembling the Gettier problem.

Modern societies progressed to the second and third levels of SOR, *corrected* and *verified sense*, which resembles more foundationalism. Due to observations in the microcosm, modern societies were able to observe candidates in the microcosm for the missing link of inheritance, which had still to be confirmed. Observation under a microscope reveals that the sperm is filled with spermatozoid cells containing in humans 46 chromosomes with about 20,000 genes. Genes could be considered as good candidates for transmission of inheritance at the second reasoning level of corrected sense. Now modern societies tried to verify if these candidates were indeed the transmitter of inheritance. Until the final verification at the level of verified sense, a candidate could only be considered as a hypothetic carrier, which could still reveal to be far from the truth. The corrected sense and verified sense levels of SOR resemble the foundationalist theories of epistemic justification. “On the ‘classical’ analysis of knowledge, the core of the concept of knowledge is justified true belief and the foundational

structure of knowledge simply derives from the foundational structure or justification” (Fumerton 2010, 1). If justification is inferential, then a first belief must be inferred from a second belief, which is itself inferred from a third belief, and so on *ad infinitum*. This epistemic regress argument can lead to an infinite long chain of beliefs; therefore, “there must be noninferentially justified beliefs which terminate regresses of justification” (Fumerton 2010, 3).

Modern societies verified their hypotheses of the primary level by changing genes with molecular genetic methods and showed that the traits of character also changed in plants and animals, which confirmed that the genes were the responsible missing link. In science, progression from source observations by justification of verified intermediates leading to the target observation resembles foundationalism of epistemic justification. The regress argument of classical foundationalism finally requires non-inferential knowledge, in order to stop the infinite chain of justified beliefs. The externalist version of foundationalism in the form of Alvin Goldman’s (1979) reliabilism proposes a kind of belief-independent process of sensory input, “when prompted with certain sensory input, we immediately and unreflectively reach conclusions about external objects” (Fumerton 2010, 14). In the case of the inheritance problem the sensory input corresponds to the source and to the target observations. If in reliabilism the target observation can be considered as non-inferential knowledge, it is dependent on a chain of justified beliefs regressing from the start to the target observation. Thus after verification the third level of SOR shows similarities with an external foundationalism.

## 10. Conclusion

The main subject is the analysis of SOR, which unfolds in three levels, the first at the primary sense level is found in tribal and modern societies, whereas the two others at the corrected and verified sense levels are more restricted to modern societies. Although a primary sense can often be false, it is the necessary first step in acquiring new knowledge in tribes as well as in science by a first hypothesis in modern societies. Therefore, it has to be corrected and even verified by SOR to become reliable knowledge. Although science is based on verification, this is not always realized neither in tribes nor in normal life of modern societies. Primary sense corresponds to coherentist theories of justified beliefs, whereas verified sense is similar to foundationalist theories of justified beliefs, but only after definite verification of the prior unknown missing links. The examination of tribal knowledge on the conception and birth of children allowed the description of the three levels of SOR in modern societies.

Tribal societies have ideas on the conception of a child, which seems very strange compared with the knowledge of modern societies (Malinowski 1927; 1929; Godelier 2007). One may ask why their interpretation is so incomprehensible with respect to modern societies. Is the incomprehension due to a different reasoning or only to a limited observation? In modern societies, it is known that many causes leading to the conception of a child are invisible in the macrocosm and became only visible in the microcosm after invention of new instruments and new methods. Therefore, when considering that in tribal societies observation is limited to the macrocosm, one could better understand their reasoning, which seems to be logic and similar to modern societies with respect to their available information. Due to their limited observation, the source observations for their reasoning were completely different and necessarily led to different interpretations.

The difference of reasoning may shed some light on human reasoning in general, which seems to need a sense and progresses at three sense levels. At the *pre-sense* level before any reasoning, the repeatability of some events may suggest an underlying cause, which is not understood. At the first level of reasoning, *the primary*

*sense*, as a plausible sense is first imagined. At the second level or *corrected sense* the primary sense is changed and at the third level or verified sense, the corrected sense is proven to correspond to the reality. Tribal and modern societies have the same reasoning for the pre-sense and the primary sense levels. However, tribal societies do not always progress to the corrected and verified sense levels of reasoning. Even if they had doubts, they were unable to progress to verification at the microscopic level due to lacking instrumentation. Therefore, concerning the conception of children, tribal societies had to be satisfied with a primary sense if it was considered as plausible and not in contradiction with the normal convictions of their society. The primary sense interpretation was felt as a certitude if it was plausible and supported by their anterior beliefs or the traditions of their ancestors. Reasoning at the primary sense level resembles coherentist theories of justified beliefs, which may be far away from the truth.

Although modern and tribal societies experienced primary sense interpretations for centuries, modern societies progressed after invention of amplifying instruments for observations in the microcosm and the astrocsm to the verification of primary sense ideas. In other disciplines like sociology or psychology there is no need for amplifying instruments for the microcosm, but all sciences in all disciplines are forced to proceed after the emission of primary sense hypotheses to their verification, which has to be repeated extensively, until there is no longer any doubt on their reality. That was the only way for modern societies to reach their highly reliable knowledge. Tribal societies were forced to remain with primary sense reasoning limited to the visible macrocosm, consequently all invisible causes in the macrocosm such as heredity genes had to be explained by invisible spirits, which they already believed in. This led to the remark of Godelier (2007) that there must always be more than a man and a woman to conceive a child.

Scientific reasoning operates in a similar way as foundationalism by progressing from an initial belief or source observation to a non-inferential knowledge or target observation. However, science has to explore unknown causes between the source observation and the target observation, which are imagined by “missing links” or hypothetic intermediates. The essential aim of this approach consists in retrospective justification of the hypothetic missing link. In the case of the inheritance problem, there had to be a missing link which should rely on the source observation (character of ancestors) with the target observation (similar character of offspring). The hypothetic cause imagined as genes had necessarily to be verified and should also show that its activity led to the corresponding observable effects (transmission of heredity). Only then they allowed retrospectively justifying the hypothesis as truth, which corresponds to foundationalism of justified belief.

Modern societies were able to find, after invention of scientific instruments and methods, causes which are invisible to the naked eye but may become visible with the assistance by instruments. Thus invisible causes in the macrocosm and therefore attributed to spirits by tribal societies became clearly visible and attributable to material causes in modern societies. Nevertheless, tribal societies were able to communicate with their spirits, which could have a beneficial influence on the behavior of the whole society that wanted to be in good agreement with their spirits. In contrast, the explanation by material causes discarded any communication with spirits, but verified knowledge made modern societies more efficient than spirits, for instance, when treating sterility problems by artificial insemination in vitro.

Tribal societies forced to remain at the primary sense level of reasoning were happy to have at least one plausible interpretation. As long as it was not in contradiction with the general belief of the society, there was no need for verification. This recalls a nest of wild bees, which is built over an empty space hanging only on a small branch of the tree and therefore unstable. As long as the branch is resistant, the rest of the nest over the

empty space can take any imaginable form without falling down (see fig. 2a). In the same way a false belief of a society in spirits that initiate the life of a child or transmit heredity does not threaten the survival of the society. In contrast, the belief of a sect in the near end of the world can lead to the suicide of a society. Cultured bees in hives build up stable structures, which are on all sites embedded by a frame and may symbolize verified sense in modern societies (see fig. 2b). A false primary sense is not a danger in itself and can remain a respectable belief as long as it does not directly threaten the survival of the society. Thus in tribal as well as in modern societies, multiple imaginary worlds, or primary sense interpretations only based on internal logic, may coexist and have to be respected as long as they do not threaten the whole society.



**Fig. 2a. Wild Bees in Nature with Varying Wax Constructs Symbolizing “Primary Sense.”**  
(With permission from eXtension, [www.extension.org/pages/20996/school-ipm-action-plan-for-honey-bees](http://www.extension.org/pages/20996/school-ipm-action-plan-for-honey-bees)).



**Fig. 2b. Cultured Bees in Hives with Embedded Wax Structures Symbolizing “Verified Sense.”**  
(<http://www.google.com/imgres?imgurl=http://www.treehugger.com/bee-hive.jpg&imgrefurl>).

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