

〈Paper〉

〈論文〉

One Essay - Three Textual Patterns

三つの原型による一つのテキスト分析

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Abstract

Writers of English discourse employ common patterns that are used to carry out various purposes and objectives of the writer. This study examines three distinct patterns found in a scientific essay on theories of human evolution.

Key words and phrases: written discourse; claim-counterclaim; general specific; problem-solution; textual patterns; modality; hypotheticality

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1.0 Introduction

Traditional written discourse styles suggest that the organization and development of text patterns are generally predictable based on the subject matter and issues associated with it. Readers make guesses based on past experience with similar material and discourse types.

Written discourse is not simply the giving of information. It has a social function of interacting for certain purposes with an assumed reader in mind (Holland 1996).

This study scrutinizes some common patterns of English discourse that exist in a scientific text—an article discussing theories of human evolution. Henceforth, this article will be referred to as the “Text”. The discourse patterns in the Text will be analyzed in terms of the distinct qualities that identify them with the particular patterns discussed as well as the way the pattern interacts with the reader and functions to achieve a certain objective.

2.0 Diagrammatic representation of the text

Two diagrams of the Text are provided (see Diagram 1 and Diagram 2) both/either of which may be referred to in the analysis. The Text is provided in the **Appendix** and it is recommended that the reader do an initial reading of it before proceeding on.

Diagram 1 : Claim-counterclaim

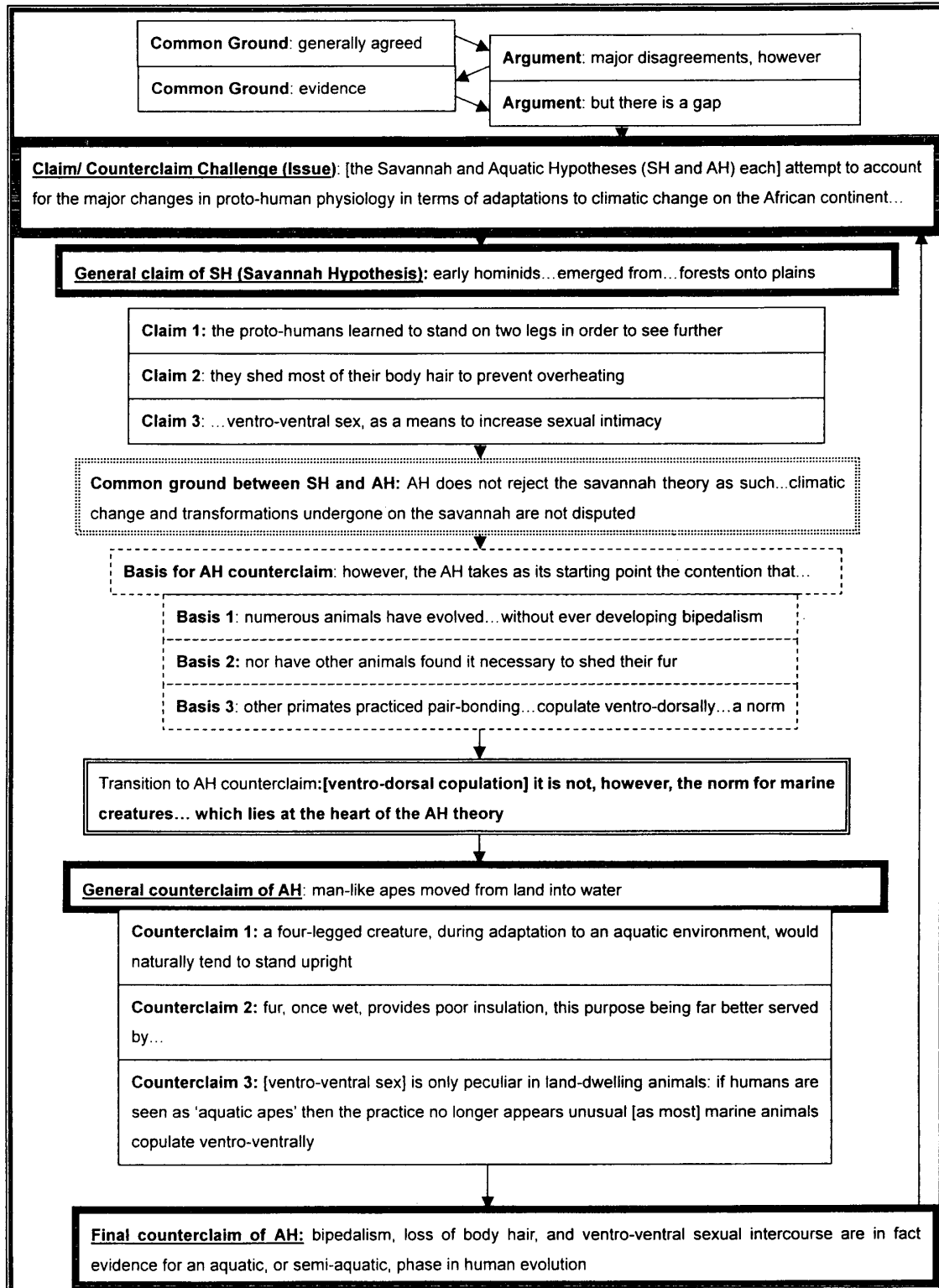
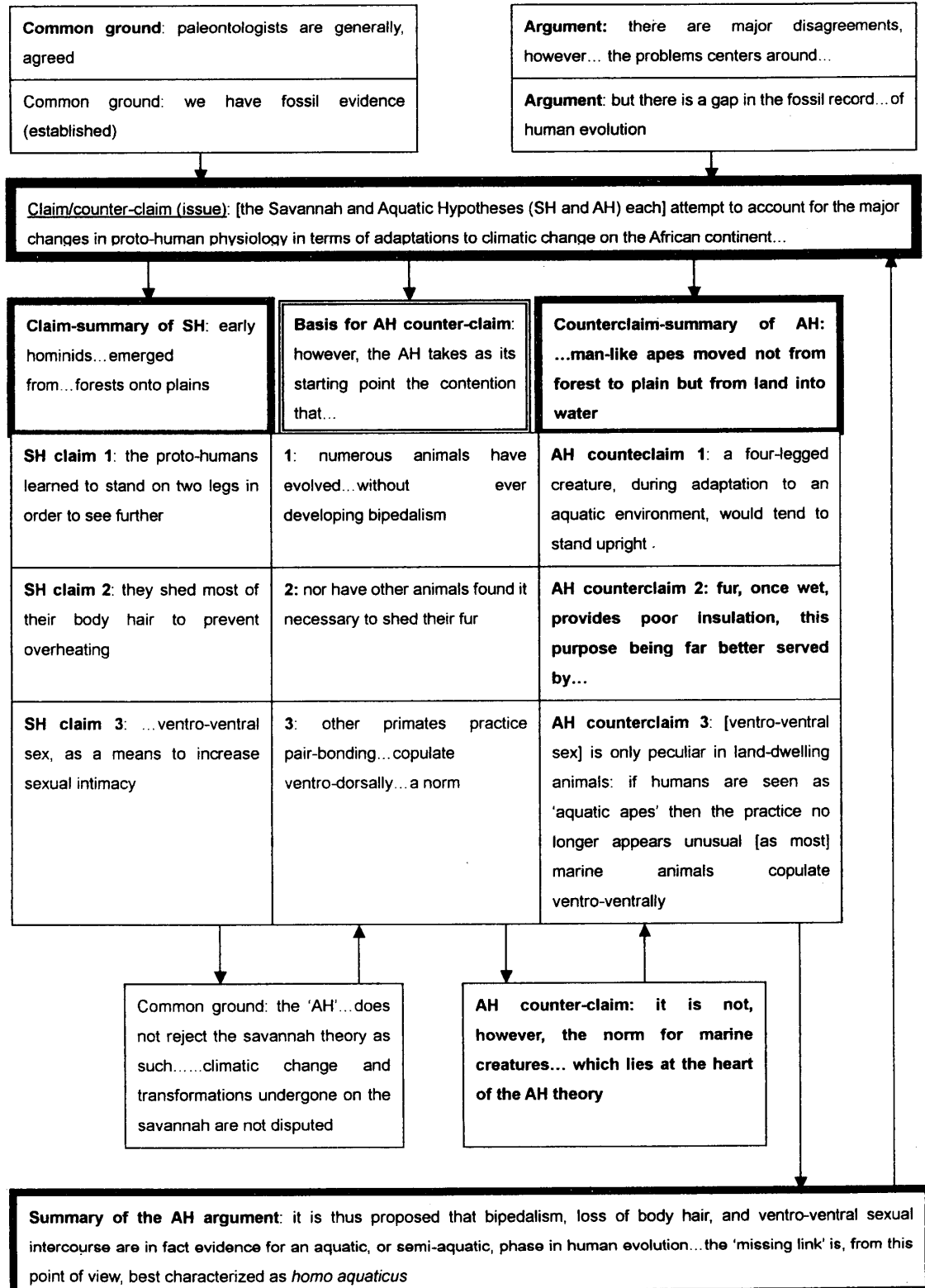
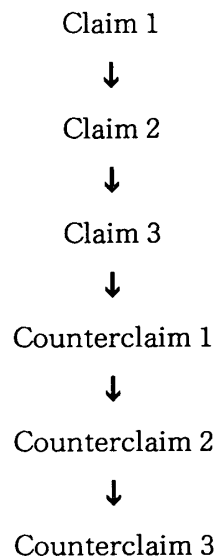


Diagram 2: Claim-counterclaim



2.1 The text: fundamentally claim-counterclaim

The structure of the Text most prominently realizes the pattern known as claim-counterclaim. Holland (1996:23) presents a diagram of a typical claim-counterclaim pattern, which resembles the structure of the Text.



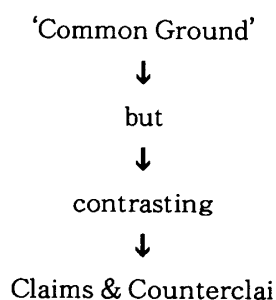
The Text begins with two points of common ground alternating with two points of controversy. This exchange includes background information from which the contending views, the Savannah Hypothesis (SH) and the Aquatic Hypothesis (AH), assert their claims. The points of argument (the issue) then remain center stage of the claim-counterclaim challenge. The SH claims attempt to explain “the astonishing transition from ‘man-like ape’ to the ape-like men’: the ‘missing link’ of human evolution”. The AH then counters these proposals with a different account of what occurred during this time period.

In the segment of text between the SH claims and the AH counterclaims exists an area that has been labeled “basis for counterclaims of the AH”. This segment introduces the basic disagreements of AH with SH from which AH launches its counterclaim arguments.

2.2 Characteristics of a claim-counterclaim text pattern

There are three main elements that characterize a claim-counterclaim pattern: common ground, a set of claims, and a set of counter-claims responding to each of the claims. Holland (1996:25) states:

At least three elements can be discerned within the pattern: 'Claim', 'Counterclaim', and what might be termed 'common ground', where points of similarity/agreement between the two sets are noted. The element of 'common ground' might appear at the beginning of a claim-counterclaim pattern, at the end, or perhaps at both beginning and end. In longer and more detailed texts, areas of consensus may be mentioned in relation to each claim or counterclaim as these are raised.



In the Text, items of common ground are presented at the beginning with the exception of the segment below, which precedes the AH's 'basis for countercliams'.

The 'Aquatic Hypothesis' ... does not reject the savannah theory as such. The centrality of climatic change and the transformations undergone on the savannah from 3 million years BP onwards are not disputed. However, the theory takes as its starting point the contention that...

The first two sentences ascertain the last time sequential common ground between SH and AH and from this point AH parts ways with SH. The first word in the next sentence is the contrastive marker however signaling a change from common ground to point of contention.

2.3 Lexical signals of claim-counterclaim

The Text exhibits various lexical signals that are typically associated with the claim-counterclaim pattern. As Holland (1996:26) notes concerning claim-counterclaim lexis:

Particular lexis tends to be used to signal each of these elements: accept, admit, agree, consensus, etc. ('common ground'); argue, assert, claim, contend, propose, see, state, view, etc. ('claim'); contest (vb.), counter, counter pose, dispute, reject, etc. ('counterclaim'). Note that 'claim' lexis might equally be used for 'counterclaim'. Contrastive discourse markers (actually, but, however, in contrast, on the contrary, on the other hand, rather, etc.) are also likely to feature prominently.

The lexical items listed below in italics are found in the Text and signal the components of the claim-counterclaim model. The contrastive discourse markers but and however tend to signal a transition from common ground to point(s) of argument.

Common ground:	paleontologists are generally <i>agreed</i> is largely <i>uncontested</i> <i>does not reject</i> <i>not disputed</i>
Contrastive discourse markers:	There are major <i>disagreements</i> , <i>however</i> Disputes persist between <i>competing</i> theories <i>However</i> , the theory takes as its starting point the <i>contention</i> It is not <i>however</i> the norm
Claim and/or counterclaim:	there may be some <i>argument</i> The <i>problem</i> centers around <i>But</i> there is a gap The 'Savannah Hypothesis' [claims] <i>proceed</i> from here The savannah theory <i>claims</i> The 'Aquatic Hypothesis' originally <i>put forward</i>

Simply *stated*

Proponents of the aquatic theory *stress* the
fact

The *argument proceeds*

They *point to* the fact

It is thus *proposed*

The aquaticists *claim*

The 'missing link' from this *point of view*

2.4 Role of modality in claim-counterclaim

Modality can be found in virtually all types of discourse if none other than the choice of expressing neutrality toward an idea. As McCarthy points out:

Discourse analysts have demonstrated that modality is fundamental in the creation of discourse; all messages choose some degree of modality, even if it is only to make a neutral choice of bald assertion.

(McCarthy 1991:85)

The function of modality is fundamental to a claim-counterclaim model as it exposes the attitude(s) and intent(s) of the writer concerning the argument(s) at hand. The writer often utilizes modality to make certain parts of a claim/counterclaim more credible (or incredible) or to persuade the reader in some way. Modality, while typically expressing itself using modal verbs, does not necessarily require them. McCarthy notes:

Modality is often thought of as the province of the closed class of modal verbs (must, can, will, may, etc.) and treated as part of the grammar of English, but a large number of 'lexical' words (nouns, adjectives, verbs, and adverbs) carry the same or similar meanings to the modal verbs.

(1991:84,85)

Holmes (1988 in McCarthy 1991:85) found that functions of modality occur more frequently in other word classes than in modal verbs. He offers some

examples: “appear, assume, doubt, guess, look as if, suggest, think, adverbs such as actually, certainly, inevitably, obviously, possibly, and nouns and adjectives related to them.”

Notice the functions of modality in the Text that use both modal verbs and other word classes to indicate the side of the argument that the writer more strongly asserts. Consider the following examples:

a move which *inevitably* meant alterations in diet
other factors *must* have been involved
indeed, a hairy coat provides better protection against both daytime sun and night-time cold than the *apparently* deviant...
a four legged creature, during the initial stages of adaptation to an aquatic environment *would* naturally tend to...
a prolonged period standing in, and/or ‘treading’, water *would* result in...
all these *would* make it more difficult...
if humans are seen as ‘aquatic apes’ then the practice no longer *appears* unusual...

2.5 Utilizing hypotheticality in claim-counterclaim

The role of hypotheticality is important to the function of modality in a claim-counterclaim text pattern and to the writer’s strategy in emphasizing it (or not) in order to persuade readers. Jordan (1984 in McCarthy 1991:80) claims, “whenever a writer needs to indicate doubt or uncertainty he uses a signal of hypotheticality to indicate this”. The issue in the Text centers around two competing hypotheses. However, notice how the author places more hypotheticality on the SH than on the AH indicating the side s/he most likely supports. The author attempts to created doubt in the reader concerning SH in order to fuel the counterclaims of the AH. There is an obvious attempt by the writer to discredit the SH and advocate the AH.

Compare the following signals found in the SH claims and AH counter-claims:

<u>Savannah Hypothesis claims</u>	<u>Aquatic Hypothesis counterclaims</u>
<i>According to</i> the Savannah Hypothesis	It <i>observes</i> that numerous
It's <i>difficult</i> to see	after <i>all</i> , four legs are <i>generally</i>
<i>Nor</i> have other animals <i>found it necessary</i>	<i>indeed</i> , a hairy coat provides <i>better</i>
<i>apparently</i> deviant evolutionary strategy	stress the <i>fact</i>
	point to the <i>fact</i>
	are <i>in fact</i> evidence

The author highlights the hypotheticality of SH while the AH claims are pervaded with of terms connecting it with fact and tangible observation creating an impression that AH is a theory that just makes more sense. The strategy employed is an effort to discredit the SH claims and fuel the AH counterclaims giving the latter a more weighty level of believability.

3.0 Subordinate patters of the text

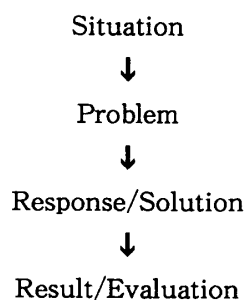
It is not uncommon to find a combination of conventional discourse patterns functioning simultaneously in a text. McCarthy (1991:159) states that "any given text may contain more than one of the common patterns, either following one another or embedded in one another."

While we have shown in detail the function of a claim-counterclaim model in the Text let us turn our attention to two subordinate patterns: problem-solution and general-specific.

3.1 Elements of a problem-solution pattern in the text

Before we expose the problem-solution pattern in the Text let us examine some common elements found in a typical problem-solution model.

Hoey (1983 in Holland 1996:12) identifies five basic elements of problem-solution: situation, (within which there is a complication or problem), problem (within the situation, requiring a response), response or solution (to the problem), and evaluation or result (of the response/solution). Thus:



The problem-solution model tends to invite certain lexical items, just as we observed earlier with claim-counterclaim. McCarthy (1991:79) has identified a number of lexical items that are commonly found in the four stages of the following problem-solution model:

<i>Problem</i>	concern, difficulty, dilemma, drawback, hamper, hinder (ance), obstacle, problem, snag
<i>Response</i>	change, combat (vb), come up with, develop, find, measure(s), respon(d/se)
<i>Solution/result</i>	answer, consequence, effect, outcome, result, solution, (re)solve
<i>Evaluation</i>	(in)effective, manage, overcome, succeed, (un)successful, viable, work (vb)

Following Hoey's (see above) itemized list of problem-solution steps, below I have noted sections of the Text that signals the individual steps.

Situation paleontologists are generally, agreed on the developments...

Problem There are major disagreements, however, amongst those attempting to explain what happened in the period immediately preceding this - the astonishing transition

from 'man-like ape' to the 'ape-like men' of 3 million years B.P. The problem centers around what is popularly known as the 'missing link.'

<u>Situation</u>	We have fossil evidence...
<u>Problem</u>	But there is a gap (what Leakey described as the 'yawning void') in the fossil record for the intervening 5 million years and, in the absence of hard evidence from this crucial period, serious - and often bitter - disputes persist between competing theories of human evolution.
<u>Response 1</u>	<p>The most widely accepted theory attempts to account for the major changes in proto-human physiology in terms of adaptations to climatic changes on the African continent at the time.</p> <p>According to the 'Savannah Hypothesis', all the startling evolutionary changes leading from ape to human proceed from here.</p>
<u>Evaluation</u>	<p>The 'Aquatic Hypothesis' - originally put forward by Sir Alister Hardy and more recently associated with Elaine Morgan* - does not reject the savannah theory as such. The centrality of climatic change and the transformations undergone on the savannah from 3 million years BP onwards are not disputed.</p> <p>(Here the Evaluation restates the situation clarifying points of unity and agreement: the common ground of the two hypotheses.)</p>
<u>Problem</u>	However, the theory takes as its starting point the contention that <u>other</u> factors must have been involved.

Response 2 (This is the AH's response to the problem of accounting for the missing link in the fossil record.)

[The Aquatic Hypothesis] observes that numerous animals have survived on the African savannah and evolved into efficient carnivorous predators without ever developing bipedalism: after all, four legs are generally much faster than two and in evolutionary terms it's difficult to see how a little extra vision would have offset the loss of speed. Nor have other animals found it necessary to shed their fur; indeed, a hairy coat provides better protection against both daytime sun and nighttime cold than the apparently deviant evolutionary strategy adopted by the 'naked ape'. A number of other primates practice pair-bonding (gibbons are in fact much more strictly monogamous than human) but continue to copulate ventro-dorsally, as is the norm for almost all terrestrial animals.

Solution (This is a theoretical solution to the problem in view of the AH.) It is thus proposed that bipedalism, loss of body hair, and ventro-ventral sexual intercourse are in fact evidence for an aquatic, or semi-aquatic, phase in human evolution. The aquaticists claim that the similarities between human beings and their marine relatives (a number of other shared features include the shedding of tears and a diminution in the olfactory sense) are simply too numerous and too striking to be mere coincidence. The 'missing link' is, from this point of view, best characterized as *homo aquaticus*.

3.1.1 Exposing the problem-solution pattern by projecting questions

An effective means by which to expose the problem-solution text pattern in the Text is by projecting questions as if taking part in a dialogue. Hoey (1983,1994 in Holland 1996:12,13) claims:

We may usefully approach the analysis of such texts by a process of 'projecting into dialogue' - the reader posing a series of questions to the text as if s/he were conversing with it. For example:

- What is (was) the situation?
- Is there anything in this situation that constitutes a problem?
- What aspect of this situation is a problem/requires a response?
- What is/are the response(s) to the problem? / What solution(s) is/are offered?
- What result(s) did (will) this response have? / How effective is this solution?
- What is the basis for saying that this solution is (in) effective?

As some of these questions are projected into the Text, the main components of the problem-solution model emerge:

What is the situation?

Paleontologists are generally, agreed on the developments that human beings underwent as there is fossil evidence.

Is there anything in this situation that constitutes a problem?

There are major disagreements amongst those attempting to explain what happened in the period of transition from 'man-like ape' to 'ape-like men'. The problem centers around what is popularly known as the 'missing link' - the gap in the fossil record.

What aspect of this situation is a problem/requires a response?

An explanation is required accounting for the major changes in proto-human physiology.

What is/are the response(s) to the problem? / What solution(s) is/are offered?

The savannah hypothesis is offered as a first response. The

aquatic hypothesis is offered as a second response and proposed solution.

What result(s) did (will) this response have? / How effective is this solution?

The savannah hypothesis response is presented in a negative light, thus eliciting a more sufficient alternative response- the aquatic hypothesis. The solution proposed by the aquatic hypothesis is effective as a 'theoretical' solution accounting for the major changes in proto-human physiology. As such it is effectively only within the limits of theory i.e. it is not a solution based on factual evidence.

Next, let us examine a second subordinate pattern in the Text.

3.2 Elements of a general-specific pattern in the text

In addition to a subordinate pattern of problem-solution, a general-specific pattern emerges in the Text. The introductory paragraph contains lexical signals of general-specific patterning as demonstrated below:

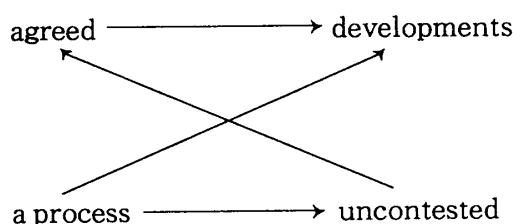
(1) While there may be some argument over details, paleontologists are generally, agreed on the developments that human beings underwent on the African plains from the emergence of Australopithecus about 3.7 million years ago. (2) The development of tools, of a hunter-gatherer economy, and of radically new social structures (3) constitute a process which has been proved beyond much reasonable doubt and is now largely uncontested.

This paragraph realizes the following pattern:

General	agreed...developments
↓	
Specific 1	tools
Specific 2	hunter-gatherer economy
Specific 3	new social structures

↑
General a process...uncontested

Notice the semantic matching of the General segments and the parallel logical sequence relations as presented below:



3.2.1 The general-specific nature of human evolution

The subject of human evolution, to at least some degree, leads one to predict a textual pattern moving from chaos (general) to order (specific), hence the term evolve. This discourse register involves explanation of events and developments in reference to progressive development in reference to time. Thus, the text pattern depends on matching and logical sequence relations to present the causal relationships between clauses concerning the processes of human development.

Winter (1994:52) claims:

the logical sequence relation is concerned with representing selective changes in a time/space continuum from simple time/space change to deductive or causal sequence which is modeled on real-world time/change. These relations can be expressed by such purely chronological event questions such as: 'What happened next?' for the next significant event, and 'What happened before that?' for the proceeding significant event. They can be expressed by deductive questions such as: 'What did that lead to?', 'What caused that to happen?', 'What do you conclude from that?', etc.

Another contributor to the general-specific pattern is the “lexical items, which constitute the vocabulary of connection in English as well as signal the understanding of the relationships between clauses” and the use of superordinates (general) and hyponyms (specific) (Winter 1977a in Holland 1996:32).

3.2.2 General-specific patterning at the macro leve

As we look at an outline of the Text the same basic human developmental concepts are addressed in the arguments for the SH, AH, and “other factors.” Following the theme of “developments that human beings underwent” the arguments address the main issues of:

1. bipedalism / tool making
2. hunting / fur shedding
3. social structures / ventro-ventral sex

These are the three sub-issues that descend from “the [general] developments”. These sub-issues each realize two elements because some emphasize one and not the other. For example, tool making is mentioned in the introductory paragraph and again in the SH, but it is ignored in the AH argument. However, due to the causal link between bipedalism and tool-making, e.g. “standing upright left their hands free to make tools”, we can associate bipedalism (which is mentioned in the AH argument without referring to tools) with tool making based on the causal relationship that connects them.

Below, the macro-level general-specific patterning of the text is highlighted.

General

The **development of tools**, of a **hunter-gatherer economy**, and of radically **new social structures**

Savannah Hypothesis

Specific 1

Standing upright left their hands free to **make tools**

Specific 2

Hunting on the hot plains was uncomfortable for creatures which had evolved in the shady forest, and they **shed most of their body hair**

Specific 3

The developing hunter-gatherer economy led to the need for new **social arrangements**...which made monogamous 'pair-bonding' a positive survival behavior... **ventro-ventral sex**

Other factors

Specific 1

Numerous animals have survived on the African savannah...without developing **bipedalism**

Specific 2

Nor have other animals found it necessary to **shed their fur**

Specific 3

A number of other primates practice **pair-bonding**, but continue to copulate ventro-dorsally

Aquatic Hypothesis

Specific 1

In their account of **bipedalism**

Specific 2

With regard to the **loss of body hair**

Specific 3

As for our odd predilection for **ventro-ventral sex**

General

It is thus proposed that **bipedalism**, **loss of body hair** and ventro-ventral sexual intercourse are in fact evidence for an aquatic, or semi-aquatic, phase in human evolution.

A general-specific patterning may also be found in the causal link from one

human developmental change to the next in the ape-to-man evolutionary process:

development of tools	(specific)
which led to...	
a hunter-gatherer economy	(more specific)
which led to...	
new social structures	(even more specific)

3.2.3 General-specific patterning in the Savannah Hypothesis

In each of the three main arguments of the Text - SH, other factors, and AH - the material is presented in a general-specific pattern. Here we will deal with only the issue of bipedalism/tool-making within the SH argument as it displays a more prominent signaling of general-specific patterning.

Presented below is the SH claim concerning bipedalism / tool making with markers showing continual specificity.

1 general

According to the 'Savannah Hypothesis' all the startling evolutionary changes leading from ape to human proceed from here.

2 specific The proto-humans learned to stand on two legs

3 specific in order to see further

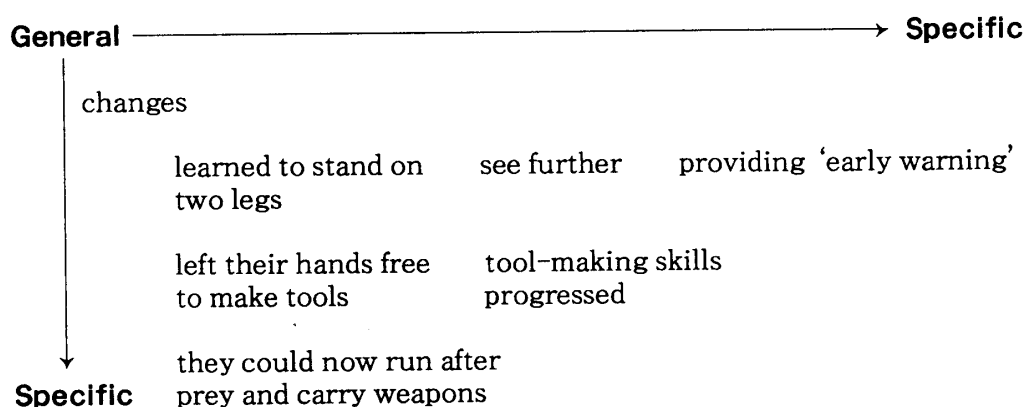
4 more specific providing 'early warning' of the approach of predators across the plain.

5 more specific Standing upright left their hands free to make tools and-

6 more specific as their tool-making skills progressed -

7 more specific bipedalism had further advantages, since they could now run after prey and carry weapons at the same time.

The 'general' lexicon is *changes* (see 1) and all proceeding references to it define it in increasingly more detailed specific terms. Thus, the following diagram:



3.2.4 Exposing general-specific by projecting questions

Finally, as Winter's questions (see 3.1.1) are projected into the portion of text below the logical sequence relations realize a general-specific pattern.

It is argued that early hominids were descendants of those apes which emerged from the dwindling forests onto the plains - a move which inevitably meant alterations in diet, precipitating a development from vegetarian to carnivore and, ultimately, to hunter.

According to the 'Savannah Hypothesis', all the startling evolutionary changes leading from ape to human proceed from here. The proto-humans learned to stand on two legs in order to see further - providing 'early warning' of the approach of predators across the plain.

a development from vegetarian to carnivore and, ultimately, to hunter.

What caused that to happen?

alteration in diet.

What caused that to happen ?

apes... emerged from the dwindling forests onto the plains.

What happened next ?

The proto-humans [needed to] see further? providing 'early warning' of the approach of predators across the plain.

What did that lead to ?

[They] learned to stand on two legs.

3.3 Relationship between the three patterns

Holland (1996:26) makes the claim that often more than one text pattern exists in a given discourse sample. Such is the case with the Text. Holland illustrates this collaboration of text with the following example: "we might imagine these patterns as being inscribed upon transparent acetate, like over-head projector transparencies, where one may be laid over another but both remain visible."

In the Text we have a claim-counterclaim sharing its territory with a problem-solution and a general specific structure, yet the three function simultaneously. The problem-solution and general specific patterns are subordinate to the claim-counterclaim pattern and they each have their own way of relating to the dominant structure:

Problem-solution	Lexical Signal	Claim-counterclaim	General-specific
situation	generally, agreed	common ground	
problem	But there is a gap, the missing link	challenge	
response 1	Savannah Hypothesis	claim claim claim	general specific
negative evaluation (problem)	other factors must have been involved	basis for counter- claim	general specific
response 2	Aquatic Hypothesis	counterclaim counterclaim counterclaim	general specific
evaluation/ hypothetical solution	It is thus proposed	proposal; overall claim	

4.0 Conclusion

In this study we have exploited the Text and have uncovered three distinctive traditional textual patterns commonly used in English written discourse: claim-counterclaim, problem-solution, and general-specific. Each of these patterns have been exemplified through various diagrams, and sentence sequence patterns that identify them with the textual pattern in question. We have also examined the various signals in the Text, which realize the three patterns, and the lexical items that commonly accompany each respective pattern. It has been shown that each of these patterns displays a certain objective of the author such as presenting a set of arguments or hypotheses, influencing the opinion of the reader one way or another, solving a problem, or presenting information in the clearest way possible.

There are an endless number of genres in written discourse, and many text patterns that realize them, far more than could be examined in a study of this size. However, the three patterns that have been brought to light and examined in this study have been shown to play an important role and occur frequently in contemporary written discourse throughout the English-speaking world.

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Appendix

While there may be some argument over details, paleontologists are generally, agreed on the developments that human beings underwent on the African plains from the emergence of *Australopithecus* about 3.7 million years ago. The development of tools, of a hunter-gatherer economy, and of radically new social structures constitute a process which has been proved beyond much reasonable doubt and is now largely uncontested. There are major disagreements, however, amongst those attempting to explain what happened in the period immediately preceding this- the astonishing transition from 'man-like ape' to the 'ape-like men' of 3 million years B.P.

The problem centres around what is popularly known as the 'missing link'. We have fossil evidence of manlike apes (*Ramapithecus*) which lived in the East African Rift Valley around 9 million years ago. There are relatively plentiful fossilised remains of *Australopithecus*, *Homo Habilis* and *Homo Erectus*, from the same area and dating from 3.7 million years B.P. onwards. Analysis of bones from these later anthropoids suggests that they already exhibited many of the features which typify modern man: they were, for example, bipedal. But there is a gap (what Leakey described as the 'yawning void') in the fossil record for the intervening 5 million years and, in the absence of hard evidence from this crucial period, serious - and often bitter - disputes persist between competing theories of human evolution.

The most widely accepted theory attempts to account for the major changes in proto-human physiology in terms of adaptations to climatic change on the African continent at the time. A progressively hotter, drier climate and the consequent replacement of forests by grassy plains (*savannah*) over large areas of the land mass meant that certain species of ape were gradually deprived of what had been their natural environment. It is argued that early hominids were descendants of those apes which emerged from the dwindling forests onto the plains - a move which inevitably meant alterations in diet, precipitating a development from vegetarian to carnivore and, ultimately, to hunter.

According to the 'Savannah Hypothesis', all the startling evolutionary changes leading from ape to human proceed from here. The proto-humans learned to stand on two legs in order to see further - providing 'early warning' of the approach of predators across the plain. Standing upright left their hands free to make tools and - as their tool-making skills progressed - bipedalism had further advantages, since they could now run after prey and carry weapons at the same time. Hunting on the hot plains was uncomfortable for creatures which had evolved in the shady forest, and they shed most of their body hair to prevent

overheating. The developing hunter-gatherer economy led to the need for new social arrangements - particularly regarding the care of the young - which made monogamous 'pair-bonding' a positive survival behaviour. The savannah theory claims that ventro-ventral (face-to-face, literally '*belly-to-belly*') sex, which is almost unheard-of among other primates, developed as a means to increase sexual intimacy and thus cement the pair-bond.

The 'Aquatic Hypothesis' - originally put forward by Sir Alister Hardy and more recently associated with Elaine Morgan* - does not reject the savannah theory as such. The centrality of climatic change and the transformations undergone on the savannah from 3 million years BP onwards are not disputed. However, the theory takes as its starting point the contention that other factors must have been involved. It observes that numerous animals have survived on the African savannah and evolved into efficient carnivorous predators without ever developing bipedalism: after all, four legs are generally much faster than two and in evolutionary terms it's difficult to see how a little extra vision would have offset the loss of speed. Nor have other animals found it necessary to shed their fur; indeed, a hairy coat provides better protection against both daytime sun and night-time cold than the apparently deviant evolutionary strategy adopted by the 'naked ape'. A number of other primates practise pair-bonding (gibbons are in fact much more strictly monogamous than human) but continue to copulate ventro-dorsally, as is the norm for almost all terrestrial animals.

It is not, however, the norm for marine creatures, and it is this insight which lies at the heart of the aquatic theory. Simply stated, the aquatic hypothesis is that during the catastrophic changes in the African climate, the man-like apes initially moved not from forest to plain but from the land into the water - just as the precursors of modern marine mammals must at one time have done. Unlike the ancestors of the whale and the dolphin, these proto-humans later moved back onto dry land, but the creatures which emerged from the water were much changed. Various pre-adaptations to the physiological differences between them and other primates had already been introduced, and it was these which led to the development of *homo sapiens* on the savannah.

In their account of bipedalism, proponents of the aquatic theory stress the fact that no mammal - with the single exception of man - has ever developed the habit of walking and running on two feet, with its spine perpendicular to the ground. Even those which do occasionally stand on their hind legs (and it is admitted that this constitutes an advantage for spotting predators on the plain) invariably drop back onto all fours in order to run. The argument proceeds by noting that a four legged creature, during the initial stages of adaptation to an aquatic environment, would naturally tend to stand upright in order to keep its head out of the water to

breathe, and that it would be better able to do so due to the buoyancy that water provides. A prolonged period (we are talking here about several million years) standing in, and/or 'treading', water would result in a shift in the creature's centre of gravity, in the development of a more flexible spine, and in an altered pelvic structure. All these would make it more difficult for such an animal to revert to quadrupedalism on its return to a terrestrial existence.

With regard to the loss of body hair, they point to the fact that fur, once wet, provides.

poor insulation, this purpose being far better served by fat *under* the skin - hence the thick layer of blubber in relatively hairless marine mammals like the whale, and a lot of subcutaneous fat in wallowing creatures like the hippopotamus and pig. Subcutaneous fat is demonstrably far more extensive in humans than in any other ape, indeed *homo sapiens* is the only primate which lays down surplus fat in a layer under its skin. As for our odd predilection for ventro-ventral sex, the aquatic contention is that this is only peculiar in land dwelling animals: if humans are seen as 'aquatic apes' then the practice no longer appears unusual. The vast majority of marine mammals copulate ventro-ventrally, and the exceptions are largely those species which come to shore to mate.

It is thus proposed that bipedalism, loss of body hair, and ventro-ventral sexual intercourse are in fact evidence for an aquatic, or semi-aquatic, phase in human evolution. The aquaticists claim that the similarities between human beings and their marine relatives (a number of other shared features include the shedding of tears and a diminution in the olfactory sense) are simply too numerous and too striking to be mere coincidence. The 'missing link' is, from this point of view, best characterised as *homo aquaticus*.

* see Morgan's *The Descent of Woman* (1972), *The Aquatic Ape* (1982) and *The Scars of Evolution* (1990).