Medical academic writing versus general writing: a systemic grammar perspective

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1.0 Introduction

Peter R. R. White, describes 'systemics' as that which provides an 'account of the grammar of the language as it is used in actual social situations and hence is concerned at all times with the meaning, communicative functionality and rhetorical purposes of language' (2000). This analysis examines two scientific texts, one for specialists and one for a general audience using the systemic framework devised by M. A. K. Halliday. Through the identification and analysis of the lexico-grammatical differences between the two texts using aspects of the systemic framework, this paper seeks to determine the stylistic and communicative consequences of these differences.

1.1 The texts

The texts, which can be found in Appendix 1, describe the effects of alcohol on the body. While both texts are examples of scientific writing, the first, entitled Pickled Livers, is written for a more general audience and the second, entitled The Neurophysiology of Alcohol, is an example of what can be described as 'expert' or 'specialist' writing. Text 1 is taken from New Scientist magazine, which describes its audience to be 'not exclusively from scientific and technical fields. [Their] readers are business decision-makers and consumers from diverse backgrounds' (New Scientist). The New Scientist website goes on to add that their readers are particularly affluent and that 92% of readers are alcohol drinkers. As we will see though detailed analysis, characteristics and features of Pickled Livers is written to appeal to this particular audience.

The Neurophysiology of Alcohol, on the other hand is a typical example scientific academic writing published in a book called *The Psychopharmacology of Alcohol*. This book is a collection of research papers among which include similar technical sounding titles such as *Genetic contributions to normal and abnormal drinking*. Text 2's principle author M.S. Berry is a prolific researcher on the effects of alcohol. He has authored and co-authored numerous works including *A critical evaluation of claimed relationships between alcohol intake and aggression in infra-human animal, Neurophysiological and endocrinological consequences of alcohol,* and *Ethanol-induced enhancement of defensive behaviour in different models of murine aggression*. These titles signal the academic nature of his writing. It can be said that the readership is likely to consist of experts seeking to deepen their existing expertise. Analysis of Text 2 will show the particularities commonly found in this type of specialist discourse.

1.2 The basis for analysis

The Eggins Model, is based on Halliday's pioneering work, has been chosen to execute this analysis. Because the selected texts are similar in that they are both scientific texts that describe the affects of alcohol, and different in that one is academic and the other is more for a general audience, a contrastive analysis was deemed the method of choice. The Hallidayan theory that all texts possess three types of meaning, interpersonal, experiential, and textual meanings simultaneously, is the foundation upon which Eggins builds her analytical methodology. The organization of the clause for Mood, Transitivity, and Theme are the key aspects of the lexico-grammar that will be examined in this contrastive analysis.

The lexico-grammatical features of the texts will be compared and contrasted to reveal the ultimate stylistic and communicative consequences of the differences discovered.

1.3 Essential terms

To effectively communicate the stylistic effects of the two texts, several key terms are used. Some of these terms are defined below:

meaning: within systemic theory, meaning refers to the function or communicative purpose a particular wording (Thompson, 1996)

interpersonal meanings: the meanings associated with verbal or written interactions between or among people to perform such functions as to influence others, fill social roles, adopt a position and to form bonds; they basically exist in four types, declarative, interrogative, imperative and that of the offer; they link to the social context through variations in *tenor* which is the roles and relationships of the interlocutors (White, 2000)

experiential meanings: the meanings by which speakers express their understanding or interpretation of some external reality, to reflect upon or identify patterns of experience; the three main constituents are processes, participants and circumstances; they link to the social context through variations in *field* which is the area of human experience encompassed by the text (White, 2000)

textual meanings: meanings in which interpersonal and experiential meanings interact with each other and with the situation in which the communication occurs; they link to the social context through variations in *mode* which is the actual means by which the communication occurs (White, 2000)

clause: defined as "any stretch of language centred on a verbal group" (Thompson, 1996)

2.0 Analytical Methodology and Application

Analyzing the texts to discover communicative functionality with respect to the three meanings described above and how those meanings interact with the social context can be done using various aspects of the systemic framework. However, for the purposes of this paper, selected aspects of the framework form the structure of the analysis. The fundamental element to be examined is the clause. The way to identify the main functions of clauses that realize the Mood, Transitivity, and Theme structures will be outlined and applied to contrast both texts. Finally, a summary of the findings from each of the aspects will bring all the aspects together to form a clear picture of the results.

2.1 Mood: interpersonal meaning

An exploration of Mood is that which allows the examination of clauses to reveal interpersonal meanings, that is to say the four basic social functions those clauses perform among participants (statement, question, command and offer). Through this investigation

of Mood, the way in which the interpersonal meanings affect the *tenor* of the texts will also be revealed. To clearly illustrate the differences between Pickled Livers and The Neurophysiology of Alcohol, we will need to first define the Mood structures, identify them in our two texts and then discuss the meaning of the results.

The clauses in both texts were examined and categorized according to three basic types of Mood, which are declarative, interrogative and imperative (see Table 1 below). Other sub-types exist but for the purpose of this investigation, these and other types that did not appear in either of the texts are not listed. Declarative type clauses are typically used to impart information while interrogative ones are used to ask questions. Interrogative type clauses were found in two basic sub-types, polar (yes or no questions), and WH (WH questions). The third is the imperative, which is generally used to give orders and instructions. As we shall see, the presence or absence of the various types gives insight into the positioning of writer to establish a specific relationship with the reader.

Table 1.

Mood type	Abbreviation	Pickled Livers	Neurophysiology of Alcohol
Declarative - full	[Dec. f]	23	21
Declarative - elliptical	[Dec. e]	2	0
Interrogative - polar	[Int. p]	1	0
Interrogative - WH	[Int. WH]	1	0
Imperative - full	[Imp]	4	0
total ranking clauses		**33**	**21**

Examining Mood reveals various aspects of the interpersonal relationship between interlocutors such as 'the power or solidarity of their relationship; the extent of their intimacy; their level of familiarity with each other; and their attitudes and judgements' (Eggins, 2004).

Analysis of all the clauses in both texts for Mood revealed the vast majority of the clauses in both texts are of the full declarative type. This is to be expected considering both texts have been written primarily to impart information. However, closer examination of the individual clauses showed a striking difference between the two texts. Imperative and interrogative clauses such as "Down a few drinks" and "So what's going on?" serve to establish an intimacy and familiarity with the reader. While Pickled Livers made use of other clause types (Dec. e, Int. p, Int. WH, Imp), they were absent in The Neurophysiology of Alcohol. The exclusive use of full declarative clauses in Text 2 is consistent with the expectations that a text designed to convey information to its audience has.

Pickled Livers uses clauses other than full declarative ones to establish an interactivity typically found in spoken dialogue. Interrogative clauses such as "$_{(5)}$So what is going on?", while rhetorical, stimulate the reader to recognise a puzzling circumstance. The use of imperative clauses also serves to strengthen the interactivity because inherent in the imperative clause is the expectation of a response from the reader. When the author 'tells' the reader to '$_{(3i)}$Down a few drinks' using the imperative, it is expected that the reader will perhaps react by imagining him or herself having a few drinks. The use of the imperative and interrogative clauses functions to create an interpersonal exchange of sorts in that the reader will respond in some way. Thus, Pickled Livers, although a scientific text, is much

more interpersonally engaging as opposed to The Neurophysiology of Alcohol. As a result, the author of the first text, by including clauses other than strictly declarative ones, structures the text to allow interaction.

This examination of Mood has shown how the texts are structured to enable interaction. Specifically, the use of non-declarative clauses in the first text serves to raise the level of intimacy and familiarity between the author and the reader. For example, when readers are told "Yet continue drinking heavily, and for reasons that no one really understands, your liver may suddenly become inflamed, your abdomen will start to hurt all over, and you will feel sick." they get the sense that the author is looking out for their best interest. This is a direct result of the use of the imperative. This differs from the second text which uses only declarative clauses. The audience for which it is intended, being a more academic information-seeking group of readers, will appreciate the absence of other types of clauses. Imperative and interrogative clauses are not regularly used in academic writing and if present would be seen as unconventional. Examples such as "The actions of alcohol on the central nervous system (CNS) have been assessed by a variety of different electrophysiological measures, including spontaneous EEG, evoked potentials, multiple unit and single unit recording, intracellular recording, and electrical stimulation of specific brain areas" and "The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies have frequently been questioned" are typical of the full declarative mood type found in academic writing. Thusly, The Neurophysiology of Alcohol, is structured to relate to its intended audience. It is in the examination of Mood that the different *tenor* relationships with the readers are established. Until now, we have seen how from the functional grammar perspective, examination of the function of the texts

at the clause level for Mood reveals that both texts effectively convey the interpersonal meanings. Next, we shall explore the second of the three types of meanings, experiential meanings which relate to the *field* of each text.

2.2 Transitivity: experiential meaning

As we saw in section 2.1, the Mood choices the authors make express interpersonal meanings which indicate the role relationships between them and their readers in the texts hence set the *tenor* of the texts. As well as writing to establish their relationship with the readers, the writers are at the same time writing about something. Their writing has content, which is to say it makes representational or experiential meanings. Thusly, as Eggins states, "simultaneous encoding of experiential and interpersonal meanings is achieved through the simultaneous structuring of the clauses which together make up the texts" (2004). In section 2.2, the focus shifts to the organization of the clause to realize experiential meanings. In dealing with Transitivity, actions, relations, participants and circumstances are key factors.

In order to carry out transitivity analysis, five basic process types 1) material, 2) mental, 3) verbal, 4) existential and 5) relational that appeared in our texts need to be identified (behavioural processes have been left out because none were found in either text).

1) Material processes describe processes of doing, usually concrete, tangible actions often involving actors or participants which are commonly realized by nominal groups.

2) Mental processes are those which encode meanings associated with thinking, perceiving or feeling, as opposed to doing.

3) Verbal Processes typically contain three participants, sayer, receiver and verbiage and involve the use of the verb saying and its synonyms.

4) Existential Processes are realized by the verb to be and denote the existence of something.

5) Relational Processes function to encode relationships of being and having between two Participants (Butt, 2000).

Carrying out a Transitivity analysis involves determining the process type, participants and circumstances realized in any clause. Table 2 below are the results of the processes identified in both texts.

Table 2.

Process Type	Pickled Livers	The Neurophysiology of Alcohol
Material [Pr:mat]	22	6
Mental [Pr:men]	3	4
Verbal [Pr:ver]	1	4
Existential [Pr:exi]	5	3
Relational [Pr:rel]	9	8
Total number of processes	**40**	**25**

Analyzing the texts for process types reveals several key distinctions. First, Pickled livers is dominated by material processes. Because material processes are made up of concrete verbs of distinct action between or among participants and the participant involved in some of the processes is the reader, the text can be said to have typically conversational elements. Clauses which have material processes such as "(11ii)deposits of fat will build up in your liver" is typical of someone trying to explain a concept verbally to someone else. Considering that Pickled Livers is written for a general audience who's specific detailed knowledge of the effects of alcohol on the body may be limited, it is effective to use many material processes to make simple easy to understand explanations. Moreover, the entertainment factor is also a consideration in that the use of material processes involving the reader (or the reader's physiological components, organs etc.) as a participant is engaging and a reader is likely to continue reading for entertainment's sake whether they are actually seeking to deepen their knowledge on the subject or not. This works in favour of the magazine in which the text was published because using participants such as 'you' and 'your liver' makes for more entertaining content. Finally, the relatively large number of processes as opposed to the second text is an indication of the relative shorter length of the nominal groups which makes for 'lighter' more dynamic text. In terms of transitivity, Pickled Livers can be said to be appealing to the target readership.

Conversely, The Neurophysiology of Alcohol has a relatively lower number of material processes and thus a higher proportion of the other process types. Texts that mainly consist of processes other than material ones are more static and abstract as they tend to be about conscious cognition and defining as well as describing the participants in the clauses. In research studying a corpus of exemplary experimental research articles, Iliana A.

Martinez discovered that 'both verbal and mental processes are functionally prominent in the language of science.' and that "relational processes characterise the language of science." She goes on to say that "in relational processes there are no human participants and there are no actions performed" (Martinez, 2001). From Table 2, it can be seen that The Neurophysiology of Alcohol has a much higher proportion of verbal, mental and relational processes than does Pickled Livers (64% vs. 33%). Scientific academic writing normally consists more so of processes that do not involve the reader as a participant in the clause. Examination of the processes in Text 2 shows that it adheres to the standard academic writing transitivity patterns in that non-material processes make up a greater proportion of the processes. By using relational, verbal, and mental processes, the authors structure the text in a more static and abstract way. Examination of the participants in the clauses reveals that many of them tend to be abstract so this depersonalizes the text and makes it more objective and academic. "The principal effects of acute dosage of ethyl alcohol" is an example demonstrating the abstract concepts that act as participants in the processes in Text 2. Readers of The Neurophysiology of Alcohol are likely to be professionals in the field who are seeking to either broaden their knowledge or use the information presented for research purposes. For the text to be credible and admissible, it is imperative that the text conforms to the typical way in which academic papers are written. In very simple terms, from the aspect of Transitivity, this means that the text should be dominated by verbal, mental and relational processes that are familiar to the scientific community which makes up this text's readership. Transitivity analysis shows that the grammatical choices made by the authors of The Neurophysiology of Alcohol follow conventional use of process types found in regular academic writing.

This concludes our examination of transitivity. Next, we will analyse the texts for the last of the three strands of meaning, textual meanings.

2.3 Theme: textual meaning

The last of the three Hallidayan meanings is textual meaning. This differs from interpersonal and experiential meaning in that it is concerned with the order of the elements of the clause. For example, two clauses could have the same interpersonal and experiential meanings but give a different impression as a result of changing the order of the elements. Consider the following example from Text 2 "The principal effects of acute dosage of ethyl alcohol are observed in the nervous system". One of the major aspects of Theme analysis is 'old' verses 'new' information represented by the theme at the beginning of the clause (old), and the rheme, which is what remains of the clause (new). Halliday and Matthiessen define theme as "the element which serves as the starting-point for the message: it is what the clause is going to be about" (2004). To be able to identify this type of meaning rooted in the organization of the text, relying on the examination of interpersonal or experiential meaning is not sufficient. Hence the need for this third strand of meaning in the clause, textual meaning. We will proceed now with Theme analysis of our two texts.

In the English language, the first position of the clause, which is usually the first Participant, Process or Circumstance appearing in a particular clause, is the theme while the rest of the clause is the rheme. Other constituents of the theme of a clause that may exist are

interpersonal and textual in which the constituent is a mood or field element that appears before the topical constituent. "Unmarked Theme is the 'most typical' choice, and it is identified in conjunction with a MOOD analysis. The Theme is unmarked when the roles of topical Theme and Subject are played by the same element. In contrast, Marked Themes are those where the topical Theme and Subject are realized by different elements" (Unsworth, 2006). Returning to our example from Text 2, "The principal effects of acute dosage of ethyl alcohol" is the theme and the rheme is what remains of the clause "are observed in the nervous system".

Examination of the themes in both texts shows that those in The Neurophysiology of Alcohol have a higher proportion of marked themes. This indicates that 'the writer has planned the rhetorical development of the text to allow the foregrounding of Circumstantial information' (Eggins, 2004).

If we consider a spectrum of discourse with 'very' purely spoken discourse at the extreme *left* and 'very' purely written discourse at the extreme *right*, it is useful for visualizing the results of thematic analysis and what they reveal about the texts. Based on elements of Register Theory, it can be said that there is an experiential distance continuum in which at one end (*left*) language is used to accompany a social process and as ACTION whereas on the other end (*right*) language constitutes a social process and is used for REFLECTION (Martin, 1984). We will now see how this relates to our examination of theme.

On the *left* side we often find sentence-starting themes that are interpersonal or textual in the sense that they consist of a component of either one or both of these before the topical

theme. Examining the themes in both texts, it can be seen that the first has more themes which include the reader.

Pickled Livers	The Neurophysiology of Alcohol
· Could it	· The principal effects of acute dosage of ethyl alcohol
· Down	· that the tolerance and dependence which develop from chronic dosage
· and your liver	· However, considerable problems
· But take	· For example, the drug
· So what	· in each case, certain cells only
· whether you	· and different concentrations of alcohol
· But because there	· The actions of alcohol on the central nervous system [CNS]
· If you	· that experimental data
· Yet continue	· where neuronal connectivity
· and for reasons that no one really understands, your liver	· high resolution techniques
· your abdomen	· and interpretation of the actions of alcohol
· and you	· The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies

In examining themes listed in Table 3 above, one can see that the 'topic' of the topical themes tends to be very personalized frequently referring to 'we', 'your liver', 'you' etc. This dimension of theme contributes greatly to the inter-personality of the text, perhaps even more so than does the Mood. The use of textual themes at the beginning of sentences also contributes to the *left* leaning tendency of the text with examples including 'But take...', 'So what...', 'If you...', 'Yet continue...', that are more likely to be found in spoken discourse. This

personalizing of the text is in contrast to The Neurophysiology of Alcohol. As shown in table 3 above, the themes in Text 2 tend to be about such abstractions as 'effects', 'interpretation' and 'problems'. Closely examining the clauses in Text 2 reveals that the textual clauses tend to occur between clauses, which is typically seen in texts from the far *right*. Purely academic writing often consists of long nominalizations. Halliday observes that "in scientific texts the role of theme as an organiser is crucial, as those texts which have a clear thematic pattern result in readable texts, whereas texts with varied theme patterns, which in literary texts may seem to be elegant and aesthetic, in the sciences result in complex texts that are unfriendly and difficult to read" (1993c). This concludes the theme analysis of both texts thus bringing to the end this lexico-grammatical analysis.

3.0 Conclusion

Analysis of Pickled Livers and The Neurophysiology of Alcohol for the lexico-grammatical differences has shown several key features that have been identified in terms of Mood, Transitivity and Theme.

Mood analysis revealed that while both texts made use of mostly full declarative clauses, Pickled Livers also included imperative and interrogative clauses. The author's use of the imperative serves to exert authority over the reader by 'warning' about the consequences of consuming excessive amounts of alcohol. As a result, the balance of power tilts in favour of the author. In terms of Mood, the use of the interrogative serves two functions. The first is to reduce the formality of the text, especially with the use of the pronoun 'you'. The

second is to create a sort of pseudo-interactivity with rhetorical questions. The Neurophysiology of Alcohol's exclusive use of the full declarative mood type is to be expected from a formally written text designed with the absence of interpersonal interaction. The author's choice of not including other mood types serves to effectively create distance from the reader.

In terms of Transitivity, material processes dominate in Text 1 which indicates that it is primarily intended to focus on actions, events and the participants in a tangible physical sense. The higher proportion of 'non'-material especially mental, verbal, and relational processes in Text 2 indicates that it is more concerned with cognition, definitions and description in a static way. It can be said to comply with the expectations of a formally written text.

Theme analysis has revealed that the themes in Pickled Livers tend to be more about people and their body components. This makes Text 1 more similar to spoken discourse whereas the themes in The Neurophysiology of Alcohol tend to be more abstract which results in a very formal academic text.

4.0 Bibliography

Biber, D., Johansson S., Leech, G., Conrad, S., Finegan, E. 1999. *Longman Grammar of Spoken and Written English.* London : Longman, 1999.

Butt, D., Fahey, R., Feez, S., Spinks, S. and Yallop, C. 2000. *Using Functional Grammar: An Explorer's Guide.* Sydney : National Centre for English Language Teaching and Research, 2000.

Christie, Frances. 2005. *Classroom Discourse Analysis.* London : Continuum, 2005.

Eggins, Suzanne. 2004. *An Introduction to Systemic Functional Linguistics.* 2nd Edition. London : Continuum, 2004.

Halliday, M, Matthiessen, C. 2004. *An Introduction to Functional Grammar.* London : Hodder Arnold, 2004.

Halliday, M.A.K. 1985. *An Introduction to Functional Grammar.* London : Arnold, 1985.

Martin, J. R. 1984. *Children Writing: A Reader.* [ed.] F. Christie. Geelong, Vic : Deakin University Press, 1984.

Martinez, Iliana A. 2001. Impersonality in the research article as revealed by analysis of the transitivity structure. *English for Specific Purposes.* 2001, 20.

New Scientist. New Scientist Media Centre | Audience profile - New Scientist. *New Scientist.* [Online] Reed Business Information Ltd.[Cited: 16 January 2009.] http://www.newscientist.com/data/html/ns/mediacenter/uk/intro_audience.jsp.

Thompson, G. 1996. *Introducing functional grammar.* New York : St. Martin's Press, 1996.

Unsworth, L. 2006. *Researching language in schools and communities.* London : Continuum, 2006.

White, Peter R. R. 2000. *Functional Grammar.* Birmingham : The Centre for English Language Studies, 2000. ISBN 1 901 523 20 9.

5.0 Appendix 1: Texts 1 and 2 with clauses labelled

Pickled Livers [labelled for Mood] Declarative full/elliptical [Dec. f]/[Dec. e], Imperative [Imp], Interrogative-polar/WH [Int-p]/[Int-WH]

(1)Pickled Livers
(2i)Could it be the end of one size-fits-all boozing guidelines [Int-p]
(2ii)as researchers finally get into their stride? [Dec. f]
(3i)DOWN a few drinks, and then a few more, [Imp]
(3ii)and do it again the next night and the next, [Imp]
(3iii)and your liver may end up inflamed and scarred. [Dec. f]
(4i)But take the main type of liver cell, hepatocytes, [Imp]
(4ii)and soak them alone in the lab in alcohol at the kinds of concentrations found in a drinker's blood, [Imp]
(4iii)and there are no signs of this kind of damage. [Dec. f]
(5)So what is going on? [Int-WH]
(6i)It turns out [Dec. e]
(6ii)that it isn't alcohol itself that destroys liver, but the toxic free radicals and inflammatory substances released [Dec. f]
(6iii)as the body struggles to deal with it. [Dec. f]
(7i)What's more, [Dec. e]
(7ii)the severity of this response varies greatly from individual to individual. [Dec. f]
(8i)The efficiency of your alcohol-metabolising enzyme, your diet , your sex, the strength of your immune response and, most surprisingly of all, the number and type of bacteria that live in your gut may all determine [Def. f]
(8ii)whether you'll succumb to liver disease [Dec. f]
(8iii)or survive a lifetime of propping up the bar. [Dec. f]
(9i)A third of heavy drinkers – loosely defined on both sides of the Atlantic as those who put away more than five or six drinks a day – develop alcoholic hepatitis, a life threatening inflammatory condition, [Dec. f]
(9ii)and a fifth get the fatal accumulation of scar tissue that is cirrhosis. [Dec. f]
(10i)But because there are few nerves in the liver, [Dec. f]
(10ii)most people have no idea [Dec. f]
(10iii)that alcohol is messing with theirs [Dec. f]
(10iv)until the damage is in its advanced stage. [Dec. f]
(11i)If you drink regularly for a few weeks, [Dec. f]
(11ii)deposits of fat will build up in your liver. [Dec. f]
(12i)These are probably harmless, [Dec. f]
(12ii)and disappear with abstinence. [Dec. f]
(13i)Yet continue drinking heavily, [Imp]
(13ii)and for reasons that no one really understands, your liver may suddenly become inflamed, [Dec. f]
(13iii)your abdomen will start to hurt all over, [Dec. f]
(13iv)and you will feel sick. [Dec. f]
(14)This is alcoholic hepatitis. [Dec. f]

The Neurophysiology of Alcohol [labelled for Mood] Declarative [Dec. f]

(1) The Neurophysiology of Alcohol

(2i)The principal effects of acute dosage of ethyl alcohol are observed in the nervous system, [Dec. f]

(2ii)where there is a progressive and simultaneous impairment of function at many levels. [Dec. f]

(3i)It seems probable [Dec. f]

(3ii)that the tolerance and dependence which develop from chronic dosage are also due to changes in central nervous function. [Dec. f]

(4i)However, considerable problems arise in studying these effects because of the complexity of the nervous system and also because of the diversity of the actions of alcohol on it. [Dec. f]

(5i)For example, the drug can increase or decrease the synthesis, storage, release and inactivation of central neurotransmitter sub-stances, [Dec. f]

(5ii)and increase or decrease resting membrane potential and resistance, neuronal excitability, and postsynaptic receptor sensitivity; [Dec. f]

(5iii)in each case, certain cells only are affected, [Dec. f]

(5iv)and different concentrations of alcohol may have opposite effects. [Dec. f]

(6)The actions of alcohol on the central nervous system (CNS) have been assessed by a variety of different electrophysiological measures, including spontaneous EEG, evoked potentials, multiple unit and single unit recording, intracellular recording, and electrical stimulation of specific brain areas. [Dec. f]

(7)Ideally, the experimenter would like to correlate the actions of alcohol on known neuronal networks with particular changes in behaviour. [Dec. f]

(8i)However, our limited knowledge of normal brain function means [Dec. f]

(8ii)that experimental data tends to be difficult to interpret. [Dec. f]

(9i)As a consequence, many investigators have utilized a variety of peripheral vertebrate or isolated invertebrate preparations

(9ii)where neuronal connectivity is simpler and better understood than in the CNS, [Dec. f]

(9iii)high resolution techniques can be readily applied, [Dec. f]

(9iv)and interpretation of the actions of alcohol is more reliable. [Dec. f]

(10)The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies have frequently been questioned. [Dec. f]

(11i)For example, the concentrations of alcohol employed have often been well beyond those associated with the production of intoxication in mammals, [Dec. f]

(11ii)suggesting fundamental differences in action [Dec. f]

(11iii)and perhaps exaggerating the apparent role of the peripheral nervous system in the manifestations of intoxication. [Dec. f]

Pickled Livers [labelled for Transitivity] Those clauses containing one of the 6 processes are labelled as follows: Material Process [Pr:mat]; Mental Process [Pr:men]; Verbal Process [Pr:ver]; Existential Process [Pr:exi]; Relational Process [Pr:rel]

(1)Pickled Livers
(2i)Could it be the end of one size-fits-all boozing guidelines [Pr:exi]
(2ii)as researchers finally get into their stride? [Pr:mat]
(3i)DOWN a few drinks, and then a few more, [Pr:mat]
(3ii)and do it again the next night and the next, [Pr:mat]
(3iii)and your liver may end up inflamed and scarred. [Pr:rel]
(4i)But take the main type of liver cell, hepatocytes, [Pr:mat]
(4ii)and soak them alone in the lab in alcohol at the kinds of concentrations found in a drinker's blood, [Pr:mat]
(4iii)and there are no signs of this kind of damage. [Pr:exi]
(5)So what is going on? [Pr:mat]
(6i)It turns out [Pr:rel]
(6ii)that it isn't alcohol itself that destroys liver, [Pr:rel] [Pr:mat]
(6iii)but the toxic free radicals and inflammatory substances released [Pr:mat]
(6iv)as the body struggles to deal with it. [Pr:mat]
(7i)What's more, [Pr:rel]
(7ii)the severity of this response varies greatly from individual to individual. [Pr:rel]
(8i)The efficiency of your alcohol-metabolising enzyme, your diet , your sex, the strength of your immune response and, most surprisingly of all, the number and type of bacteria that live in your gut may all determine [Pr:mat] [Pr:men]
(8ii)whether you'll succumb to liver disease [Pr:mat]
(8iii)or survive a lifetime of propping up the bar. [Pr:mat]
(9i)A third of heavy drinkers – loosely defined on both sides of the Atlantic as those who put away more than five or six drinks a day – develop alcoholic hepatitis, a life threatening inflammatory condition, [Pr:ver] [Pr:mat] [Pr:mat]
(9ii)and a fifth get the fatal accumulation of scar tissue that is cirrhosis. [Pr:mat] [Pr:rel]
(10i)But because there are few nerves in the liver, [Pr:exi]
(10ii)most people have no idea [Pr:rel]
(10iii)that alcohol is messing with theirs [Pr:mat]
(10iv)until the damage is in its advanced stage. [Pr:rel]
(11i)If you drink regularly for a few weeks, [Pr:mat]
(11ii)deposits of fat will build up in your liver. [Pr:mat]
(12i)These are probably harmless, [Pr:exi]
(12ii)and disappear with abstinence. [Pr:mat]
(13i)Yet continue drinking heavily, [Pr:mat]
(13ii)and for reasons that no one really understands, your liver may suddenly become inflamed, [Pr:men] [Pr:rel]
(13iii)your abdomen will start to hurt all over, [Pr:mat] [Pr:mat]
(13iv)and you will feel sick. [Pr:men]
(14)This is alcoholic hepatitis. [Pr:exi]

The Neurophysiology of Alcohol [labelled for Transitivity] Those clauses containing one of the 6 processes are labelled as follows: Material Process [Pr:mat]; Mental Process [Pr:men]; Verbal Process [Pr:ver]; Existential Process [Pr:exi]; Relational Process [Pr:rel]

(1)The Neurophysiology of Alcohol

(2i)The principal effects of acute dosage of ethyl alcohol <u>are observed</u> in the nervous system, [Pr:men]

(2ii)where there <u>is</u> a progressive and simultaneous impairment of function at many levels. [Pr:exi]

(3i)It <u>seems</u> probable [Pr:rel]

(3ii)that the tolerance and dependence which develop from chronic dosage <u>are</u> also due to changes in central nervous function. [Pr:rel]

(4i)However, considerable problems <u>arise</u> in studying these effects because of the complexity of the nervous system and also because of the diversity of the actions of alcohol on it. [Pr:rel]

(5i)For example, the drug can <u>increase *or* decrease</u> the synthesis, storage, release and inactivation of central neurotransmitter substances, [Pr:mat]

(5ii)and <u>increase *or* decrease</u> resting membrane potential and resistance, neuronal excitability, and postsynaptic receptor sensitivity; [Pr:mat]

(5iii)in each case, certain cells only are <u>affected</u>, [Pr:mat]

(5iv)and different concentrations of alcohol may <u>have</u> opposite effects. [Pr:rel]

(6)The actions of alcohol on the central nervous system (CNS) have been <u>assessed</u> by a variety of different electrophysiological measures, <u>including</u> spontaneous EEG, evoked potentials, multiple unit and single unit recording, intracellular recording, and electrical stimulation of specific brain areas. [Pr:exi] [Pr:rel]

(7)Ideally, the experimenter would like to <u>correlate</u> the actions of alcohol on known neuronal networks with particular changes in behaviour. [Pr:men]

(8i)However, our limited knowledge of normal brain function <u>means</u> [Pr:men]

(8ii)that experimental data tends to <u>be</u> difficult to <u>interpret</u>. [Pr:rel] [Pr:ver]

(9i)As a consequence, many investigators have <u>utilized</u> a variety of peripheral vertebrate or isolated invertebrate preparations [Pr:mat]

(9ii)where neuronal connectivity <u>is</u> simpler and better understood than in the CNS, [Pr:exi]

(9iii)high resolution techniques can be readily <u>applied</u>, [Pr:men]

(9iv)and interpretation of the actions of alcohol <u>is</u> more reliable. [Pr:rel]

(10)The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies have frequently been <u>questioned</u>. [Pr:ver]

(11i)For example, the concentrations of alcohol <u>employed</u> have often <u>been</u> well beyond those <u>associated</u> with the production of intoxication in mammals, [Pr:mat] [Pr:ver] [Pr:mat]

(11ii)<u>suggesting</u> fundamental differences in action [Pr:rel]

(11iii)and perhaps <u>exaggerating</u> the apparent role of the peripheral nervous system in the manifestations of intoxication. [Pr:ver]

Pickled Livers [labelled for Theme] Themes are underlined.

(1)Pickled Livers
(2i)Could it be the end of one size-fits-all boozing guidelines
(2ii)as researchers finally get into their stride?
(3i)DOWN a few drinks, and then a few more,
(3ii)and do it again the next night and the next,
(3iii)and your liver may end up inflamed and scarred.
(4i)But take the main type of liver cell, hepatocytes,
(4ii)and soak them alone in the lab in alcohol at the kinds of concentrations found in a drinker's blood,
(4iii)and there are no signs of this kind of damage.
(5)So what is going on?
(6i)It turns out
(6ii)that it isn't alcohol itself that destroys liver,
(6iii)but the toxic free radicals and inflammatory substances released
(6iv)as the body struggles to deal with it.
(7i)What's more,
(7ii)the severity of this response varies greatly from individual to individual.
(8i)The efficiency of your alcohol-metabolising enzyme, your diet , your sex, the strength of your immune response and, most surprisingly of all, the number and type of bacteria that live in your gut may all determine
(8ii)whether you'll succumb to liver disease
(8iii)or (whether you'll) survive a lifetime of propping up the bar.
(9i)A third of heavy drinkers – loosely defined on both sides of the Atlantic as those who put away more than five or six drinks a day – develop alcoholic hepatitis, a life threatening inflammatory condition,
(9ii)and a fifth get the fatal accumulation of scar tissue that is cirrhosis.
(10i)But because there are few nerves in the liver,
(10ii)most people have no idea
(10iii)that alcohol is messing with theirs
(10iv)until the damage is in its advanced stage.
(11i)If you drink regularly for a few weeks,
(11ii)deposits of fat will build up in your liver.
(12i)These are probably harmless,
(12ii)and (they'll) disappear with abstinence.
(13i)Yet continue drinking heavily,
(13ii)and for reasons that no one really understands, your liver may suddenly become inflamed,
(13iii)your abdomen will start to hurt all over,
(13iv)and you will feel sick.
(14)This is alcoholic hepatitis.

The Neurophysiology of Alcohol [labelled for Theme] Themes are underlined.

(1) The Neurophysiology of Alcohol
(2i)The principal effects of acute dosage of ethyl alcohol are observed in the nervous system,
(2ii)where there is a progressive and simultaneous impairment of function at many levels.

(3i)It seems probable
(3ii)that the tolerance and dependence which develop from chronic dosage are also due to changes in central nervous function.
(4i)However, considerable problems arise in studying these effects because of the complexity of the nervous system and also because of the diversity of the actions of alcohol on it.
(5i)For example, the drug can increase *or* decrease the synthesis, storage, release and inactivation of central neurotransmitter substances,
(5ii)and (it can) increase *or* decrease resting membrane potential and resistance, neuronal excitability, and postsynaptic receptor sensitivity;
(5iii)in each case, certain cells only are affected,
(5iv)and different concentrations of alcohol may have opposite effects.
(6)The actions of alcohol on the central nervous system (CNS) have been assessed by a variety of different electrophysiological measures, including spontaneous EEG, evoked potentials, multiple unit and single unit recording, intracellular recording, and electrical stimulation of specific brain areas.
(7)Ideally, the experimenter would like to correlate the actions of alcohol on known neuronal networks with particular changes in behaviour.
(8i)However, our limited knowledge of normal brain function means
(8ii)that experimental data tends to be difficult to interpret.
(9i)As a consequence, many investigators have utilized a variety of peripheral vertebrate or isolated invertebrate preparations
(9ii)where neuronal connectivity is simpler and better understood than in the CNS,
(9iii)high resolution techniques can be readily applied,
(9iv)and interpretation of the actions of alcohol is more reliable.
(10)The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies have frequently been questioned.
(11i)For example, the concentrations of alcohol employed have often been well beyond those associated with the production of intoxication in mammals,
(11ii)suggesting fundamental differences in action
(11iii)and perhaps exaggerating the apparent role of the peripheral nervous system in the manifestations of intoxication.